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PATIENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

| | |
|--|--|
| Date of mailing (day/month/year) 08 February 2001 (08.02.01) | |
| International application No. PCT/GB00/02127 | Applicant's or agent's file reference NJH/MP585604 |
| International filing date (day/month/year) 02 June 2000 (02.06.00) | Priority date (day/month/year) 04 June 1999 (04.06.99) |
| Applicant YONNET, Claude | |

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 28 December 2000 (28.12.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

| | |
|--|--|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35 | Authorized officer Juan Cruz Telephone No.: (41-22) 338.83.38 |
|--|--|

INTERNATIONAL SEARCH REPORT

Int. Application No

PCT/GB 00/02127

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G05D16/16 G05D16/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G05D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | US 4 966 188 A (GARTNER JOSEF ET AL) 30 October 1990 (1990-10-30) the whole document | 1-10 |
| X | DE 37 41 364 A (HONEYWELL REGELSYSTEME GMBH) 15 June 1989 (1989-06-15) the whole document | 1-10 |
| X | GB 2 284 687 A (DELTA FLUID PRODUCTS LTD) 14 June 1995 (1995-06-14) figure 1 | 1-7 |
| | -/-- | |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

13 September 2000

Date of mailing of the international search report

26/09/2000

Name and mailing address of the ISA

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Philippot, B

INTERNATIONAL SEARCH REPORT

Int. Jonal Application No

PCT/GB 00/02127

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | WKS: "Automatischer Durchflussregler" TECHNISCHE RUNDSCHAU., vol. 62, no. 44, 16 October 1970 (1970-10-16), page 29 XP002147281 HALLWAG VERLAG. BERN., CH ISSN: 1023-0823 the whole document ----- | 1-7 |
| X | FR 1 582 851 A (FISHER GOVERNOR COMPANY) 10 October 1969 (1969-10-10) | 1,6-10 |
| A | page 2 -page 3 figures 1,2,4 ----- | 2-5 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. Jonal Application No

PCT/GB 00/02127

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---------------------|---|--|
| US 4966188 A | 30-10-1990 | DE 3828002 A GB 2223109 A,B IT 1231495 B NL 8902084 A,B, | 22-02-1990 28-03-1990 07-12-1991 16-03-1990 |
| DE 3741364 A | 15-06-1989 | NONE | |
| GB 2284687 A | 14-06-1995 | NONE | |
| FR 1582851 A | 10-10-1969 | NONE | |

(19) World Intellectual Property Organization
International Bureau



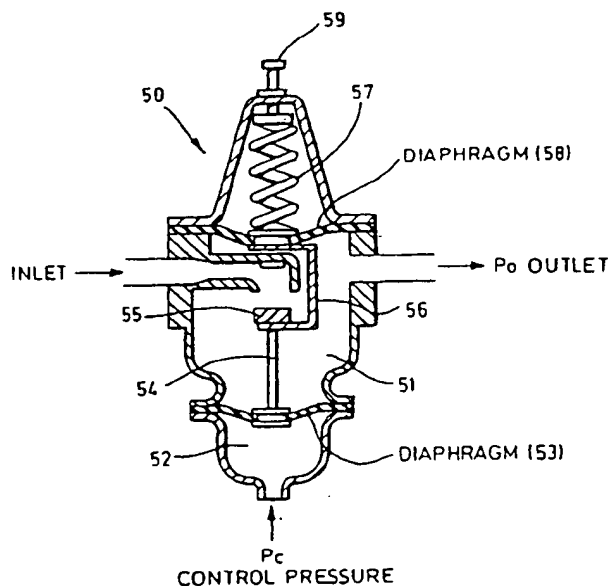
(43) International Publication Date
14 December 2000 (14.12.2000)

PCT

(10) International Publication Number
WO 00/75741 A1

- (51) International Patent Classification⁷: G05D 16/16, (74) Agents: HACKNEY, Nigel, J. et al.; Mewburn Ellis, York House, 23 Kingsway, London WC2B 6HP (GB).
- (21) International Application Number: PCT/GB00/02127 (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (22) International Filing Date: 2 June 2000 (02.06.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 9913058.5 4 June 1999 (04.06.1999) GB (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- (71) Applicant (*for all designated States except US*): TECHNOLOG LIMITED [GB/GB]; Ravensthorpe Road, Wirksworth, Matlock, Derbyshire DE4 4FY (GB).
- (72) Inventor; and
- (75) Inventor/Applicant (*for US only*): YONNET, Claude [FR/GB]; The Home Close, 36 Edge Road, Matlock, Derbyshire DE4 3NH (GB).
- Published:
— With international search report.
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: PILOT VALVE



(57) Abstract: There is provided a pilot valve (50), suitable for use in water and gas supply systems, the valve including biasing means (57), to control a gate (55), for controlling fluid flow through a control chamber (51), and a second chamber (52), which is sealed by a diaphragm (53), the second chamber (52), in use, receiving a control pressure for controlling the operation of the gate (55), such that an increase in control pressure acts to reduce fluid flow through the gate (55). The side of the diaphragm (53), against which the control pressure is not applied, is in fluid communication with the control chamber (51).

WO 00/75741 A1

PILOT VALVE

The present invention relates to a pilot valve, for example of the type which is commonly used to control a pressure reducing valve in water and gas supply systems.

Figure 1 illustrates the use of a "single chamber" pilot valve 1 to control a pressure reducing valve (PRV - shown schematically as item 2) as commonly used in a water supply system. In the context of a gas supply system such a pressure reducing valve is normally known as a "regulator" or "governor", but herein the single term "PRV" is used for simplicity as referring to both types of system. The fluid to be controlled (usually water or gas, and in this example will be taken to be water) flows along the main pipe 3 through the PRV. The outlet pressure (P_o) is usually less than the inlet pressure (P_i) due to the action of the PRV.

The amount of pressure reduction is controlled by operation of the PRV under control of pilot valve 1. An auxiliary flow pipe 4 carries water from the inlet of the PRV to the control chamber 5 of the pilot valve 1 and then back to the outlet of the PRV. Prior to entering the control chamber 5, the water passes through a venturi chamber (or primary orifice) 6 or, more correctly in the context of a gas supply system, an inspirator 6 and the

water pressure (P_v) at the outlet side 7 of the chamber or inspirator controls the PRV.

The flow of water through the control chamber 5 is controlled by a gate mechanism 8 which is linked to a diaphragm 9. A spring 10 applies force to the rear of the diaphragm 9 and the amount of force supplied by the spring may be varied by an adjustment screw 11.

10 In a steady state situation (where P_o remains constant) the water pressure in the control chamber 5 will be balanced by the force generated the spring and the gate 8 will remain in a constant position. Thus the flow through the auxiliary pipe 4 will remain constant and P_v 15 will remain constant.

If the control pressure (P_o) fails, the spring 10 causes the gate 8 to open further and the flow through the auxiliary pipe increases. Accordingly, the flow through 20 the venturi 6 also increases which results in pressure P_v decreasing, causing the PRV to open further. This results in the control pressure P_o rising again and the system should then reach a steady state again at the previously set value of P_o .

25

In order to provide an improved control system, the present applicant has already disclosed a system which

uses a "dual chamber" pilot valve in European Patent No. 574241. Figure 2 shows an example of a system utilising a "sandwich plate" dual chamber pilot 20. The pilot valve 20 performs the same general function in the control system as the pilot valve of Figure 1 but in this example the adjustment previously provided by adjustment screw 11 is effectively supplemented by an adjustment using a control pressure (P_c). As further relevant background art may be mentioned the gas supply pressure control apparatus as disclosed by the present applicant in GB-A-2252848.

The pilot valve 20 includes a second chamber 21 which is effectively divided into two portions 22 and 23 by a wall 24. The control pressure P_c effectively acts against the force of spring 10 by virtue of diaphragm 26. As with Figure 1, the spring is mechanically connected by arm 28 to a gate mechanism 8 which performs the same function as previously. The arm 28 passes through wall 24 and the aperture through which it passes is sealed by a seal 29 so that chamber 23 does not contain any water but instead is vented to the atmosphere.

If the control pressure P_c remains constant, then the system operates as explained with reference to Figure 1. However, if the control pressure P_c is reduced then the gate 8 will open further thereby reducing pressure P_v and increasing the outlet pressure P_o . This is usually

referred to as a "failsafe" system since in the event that the control pressure fails i.e. fails to zero, the outlet pressure P_o will be set to its maximum value.

5 Figure 3 illustrates an alternative but mechanically equivalent "dual chamber" pilot valve arrangement to that shown in Figure 2. The arrangement of Figure 3 is sometimes referred to as a "pancake adapted" pilot. In this arrangement, the second chamber 31 is located at the
10 base of the pilot 30. As with the arrangement of Figure 2, the second chamber 31 is divided by a diaphragm 34 into two chambers 32 and 33 and the control pressure P_c is applied to chamber 32. The diaphragm 34 is mechanically linked via an arm 35 to the gate mechanism 8 but is not
15 rigidly limited to the gate or spring. The arm 35 presses into control chamber 5 via an aperture which is again sealed with seal 36.

In the embodiment of Figure 3, the control pressure
20 P_c again opposes the force produced by the spring 10 and so the control system effectively operates in an identical manner. In other words, if control pressure P_c is reduced then the outlet pressure P_o is increased.

25 One advantage over the Figure 3 arrangement as opposed to the Figure 2 arrangement is that the additional chamber 31 can effectively be retrofitted to a single

chamber pilot valve. However one disadvantage with the dual chamber pilot valves of Figures 2 and 3 is that in both cases a seal needs to be provided in order that the control fluid is prevented from entering the second part
5 of the additional chamber i.e. that part of the chamber to which the control pressure is not applied. The provision of such a seal can be difficult and deterioration or failure of the seal may lead to reduction in performance of the pilot valve or leakage therefrom. Furthermore, the
10 friction caused by the seal can in turn create a frictional error in the quality of the pilot valve control.

Figure 4 shows a further "hydraulic" dual chamber
15 pilot valve arrangement. As with the previous embodiments, a second chamber 40 is provided which is divided by a diaphragm 41 into two parts 42 and 43. The control pressure P_c is applied to part 42 of the second chamber 40 and part 43 is connected to the spring chamber
20 which is vented to the atmosphere. As before, the diaphragm 41 is mechanically connected to the gate 8, in this case via the spring 10.

However, unlike the embodiments of Figure 2 and
25 Figure 3 in the embodiment of Figure 4 the control pressure P_c acts in the same direction as the force of the spring 10, rather than against it. This means that the

control system works in the opposite way to that of
Figures 2 and 3 i.e. if the control pressure P_c is reduced
then the gate 8 closes further, the venturi pressure P_v
increases causing the PRV to close further and the outlet
5 pressure to drop. This arrangement is not considered to
be "failsafe" since a loss of control pressure P_c would
result in the lowest possible outlet pressure P_o . This is
sometimes referred to as a "direct acting" control system
rather than the "reverse acting" control systems of
10 Figures 2 and 3.

The present invention aims to provide a pilot valve
of the "reverse acting" type but which eliminates the need
for a seal.

15

In a first aspect, the present invention provides a
pilot valve which includes

biassing means to control a gate for controlling
fluid flow through a control chamber;

20 a second chamber sealed by a second chamber diaphragm
into which control pressure is applicable for also
controlling the operation of the gate, whereby in use an
increase in control pressure acts to reduce fluid flow
through the gate;

25 wherein the side of the diaphragm against which the
control pressure is not applied is in fluid communication
with the control chamber.

In this way, a "reverse acting" dual chamber pilot valve is provided in which the need for any seal in association with the second chamber is avoided.

5 The fluid which in use flows through the control chamber may or may not be the same fluid or type of fluid as the fluid which in use is used to apply the control pressure. The fluids in question may, for example, be water or gas. In other words, in one example both fluids
10 in question may be water; in another example both fluids may be gas; in a third example one fluid may be water and the other gas.

Preferably, the biasing means is a spring means or
15 spring such as a helical spring. Preferably the biasing means is biased to open the gate and may be rigidly connected to the gate by a suitable mechanical linkage. Preferably the diaphragm is also rigidly connected to the gate and/or biasing means via the same or a second
20 suitable mechanical linkage.

Preferably, the control chamber is at least partly bounded by a control chamber diaphragm in addition to the second chamber diaphragm. Preferably biasing means is
25 located on the opposite side of the control chamber diaphragm to the control chamber. As will be explained in detail later in the specification, by appropriately

selecting the areas of the second chamber diaphragm and the control chamber diaphragm, the effect of the control pressure on the fluid flow through the control chamber (and therefore in use, on the outlet pressure) can be
5 selected.

In a preferred embodiment, the ratio of the area of the control chamber diaphragm to the second chamber diaphragm is 2:1 or less. For example, if the control
10 chamber diaphragm is twice the area of the second chamber diaphragm then a particular drop in control pressure will result in an identical increase in outlet pressure. In a different example, if the area of the second chamber diaphragm is three-quarters that of the control chamber
15 diaphragm then an increase in control pressure of a given amount would cause the outlet pressure to decrease by three times that amount. The particular case in which the second chamber diaphragm area is half that of the control chamber diaphragm effectively replicates the function of
20 the "sandwich" and "pancake" arrangements described earlier with reference to Figures 2 and 3.

Embodiments of the present invention will now be described by way of example with reference to the
25 accompanying drawings in which:

Figure 1 is a schematic diagram of a single chamber

pilot valve control arrangement;

Figure 2 is a schematic diagram of a "sandwich" dual chamber pilot valve arrangement;

Figure 3 is a schematic diagram of a "pancake" dual
5 chamber pilot valve arrangement;

Figure 4 is a schematic diagram of a "hydraulic" dual chamber pilot valve arrangement; and

Figure 5 is a schematic diagram of a pilot valve according to an embodiment of the present invention.

10

Figure 5 shows a pilot valve 50 which includes a control chamber 51 and a second chamber 52. A control pressure P_c is applied to chamber 52 in use and chamber 52 is divided from control chamber 51 by a second chamber
15 diaphragm 53.

The second chamber diaphragm 53 is rigidly connected via linkage 54 to a gate mechanism 55. The gate mechanism 55 is also connected via a further rigid linkage 56 to a
20 spring 57. The spring 57 is isolated from the control chamber 51 by the control chamber diaphragm 53. The action of the force of the spring 57 on the diaphragm 58 may be adjusted by adjustment screw 59.

25 As can be seen from Figure 5, the control fluid (which may be gas or water) present in the control chamber 51 acts against the opposite side of the second chamber

diaphragm 53 to the control pressure P_c . In operation, if, for example, control pressure P_c is reduced then the gate 55 will open further causing the fluid flow through the control chamber to increase. When used in a PRV control circuit, as explained previously, this will cause the outlet pressure to increase.

As indicated in Figure 5, the area of the control chamber diaphragm 53 is designated A and the area of the second chamber diaphragm 53 is designated as A' . The balance of forces operating in the pilot valve is as follows:

$$\begin{aligned} SF &= A P_o - A' P_c + A' P_c \\ &= (A - A') P_o + A' P_c \end{aligned}$$

In a first example, if $A' = \frac{1}{4} A$

$$SF = A' (P_o + P_c)$$

If a "multiplication" effect is required then the relative cross-section areas can be set to a different value. In a second example, if $A' = \frac{3}{4} A$, the equation will be

$$SF = \frac{1}{4} A (P_o + 3 P_c)$$

Therefore an increase of P_c of a given amount would

11

cause P_0 to decrease by three times the amount and vice versa.

The above embodiment is given by way of example only
5 and variations will be apparent to those skilled in the art.

Claims

1. A pilot valve including

biassing means to control a gate for controlling
5 fluid flow through a control chamber;
a second chamber sealed by a second chamber diaphragm
into which control pressure is applicable for also
controlling the operation of the gate, whereby, in use, an
increase in control pressure acts to reduce fluid flow
10 through the gate;

wherein the side of the diaphragm against which the
control pressure is not applied, is in fluid communication
with the control chamber.

15 2. A pilot valve according to claim 1 wherein the
biassing means is biased to open the gate.

3. A pilot valve according to claim 2 wherein the
biassing means is rigidly connected to the gate by a
20 mechanical linkage.

4. A pilot valve according to claim 3 wherein the
diaphragm is rigidly connected to the gate by a mechanical
linkage.

25

5. A pilot valve according to claim 3 or claim 4
wherein the diaphragm is rigidly connected to the biassing

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means via a mechanical linkage.

6. A pilot valve according to any one of the preceding claims wherein the biasing means is a spring means.

5

7. A pilot valve according to claim 6 wherein the spring means is a helical spring.

8. A pilot valve according to any one of the preceding
10 claims further including a control chamber diaphragm.

9. A pilot valve according to claim 8 wherein said biasing means is located on the opposite side of the control chamber diaphragm to the control chamber.

15

10. A pilot valve according to any one of claims 8 or 9 wherein the ratio of the area of the control chamber diaphragm to the second chamber diaphragm is 2:1 or less.

20

| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT | | |
|--|--|-----------------------|
| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| X | WKS: "Automatischer Durchflussregler" TECHNISCHE RUNDSCHAU., vol. 62, no. 44, 16 October 1970 (1970-10-16), page 29 XP002147281 HALLWAG VERLAG. BERN., CH ISSN: 1023-0823 the whole document ----- | 1-7 |
| X | FR 1 582 851 A (FISHER GOVERNOR COMPANY) 10 October 1969 (1969-10-10) | 1,6-10 |
| A | page 2 -page 3 figures 1,2,4 ----- | 2-5 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. Jonal Application No

PCT/GB 00/02127

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---------------------|---|--|
| US 4966188 A | 30-10-1990 | DE 3828002 A GB 2223109 A,B IT 1231495 B NL 8902084 A,B, | 22-02-1990 28-03-1990 07-12-1991 16-03-1990 |
| DE 3741364 A | 15-06-1989 | NONE | |
| GB 2284687 A | 14-06-1995 | NONE | |
| FR 1582851 A | 10-10-1969 | NONE | |

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 07 SEP 2001

| | | |
|---|--|---|
| Applicant's or agent's file reference NJH/MP5856604 | | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) |
| International application No. PCT/GB00/02127 | International filing date (day/month/year) 02/06/2000 | Priority date (day/month/year) 04/06/1999 |
| International Patent Classification (IPC) or national classification and IPC G05D16/16 | | |
| Applicant TECHNOLOG LIMITED et al. | | |



1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

| | |
|---|---|
| Date of submission of the demand 28/12/2000 | Date of completion of this report 03.09.2001 |
| Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 · Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | Authorized officer De Syllas, D Telephone No. +49 89 2399 2591  |

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/02127

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-11 as originally filed

Claims, No.:

5 (part), 6-10 as originally filed

1-4, 5 (part) as received on 17/07/2001 with letter of 13/07/2001

Drawings, sheets:

1/5-5/5 as received on 14/08/2000 with letter of 31/07/2000

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/02127

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|------|-------------|
| Novelty (N) | Yes: | Claims |
| | No: | Claims 1-10 |
| Inventive step (IS) | Yes: | Claims |
| | No: | Claims 1-10 |
| Industrial applicability (IA) | Yes: | Claims 1-10 |
| | No: | Claims |

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/02127

1. CONCERNING SECTION V

1.1 Reference is made to the following documents:

- D1: US-A-4 966 188 (GARTNER JOSEF ET AL) 30 October 1990 (1990-10-30)
D2: DE 37 41 364 A (HONEYWELL REGELSYSTEME GMBH) 15 June 1989
(1989-06-15)
D3: GB-A-2 284 687 (DELTA FLUID PRODUCTS LTD) 14 June 1995 (1995-06-14)
D4: WKS: 'Automatischer Durchflussregler' TECHNISCHE RUNDSCHAU., vol. 62, no. 44, 16 October 1970 (1970-10-16), page 29 XP002147281 HALLWAG VERLAG. BERN., CH ISSN: 1023-0823
D5: FR-A-1 582 851 (FISHER GOVERNOR COMPANY) 10 October 1969 (1969-10-10)

1.2 Claim 1 defines a pilot valve comprising features known by the prior art disclosed by D1 to D5. More specifically:

- (i) D1 discloses a pneumatically operated gas-pressure controller. It comprises a pilot valve for controlling gas pressure through a control chamber. The pilot valve includes biasing means (15 in the sole figure of D1) to control a gate, a second chamber and a second diaphragm with the specifications defined by Claim 1. Reference is made to the sole figure, to the Abstract, to the passage at column 1, line 41 to column 2, line 10 and to column 37 to 67 describing the controller (3) and its operation.
- (ii) D2 discloses a pneumatic amplifier presenting the constructional features referring to the biasing means, the second chamber and the diaphragm settings defined by Claim 1. Reference is made to the two chambers (24, 26) and the two diaphragms (A1, A2) shown in figure 1 in connection with the common shaft (32) and the associated valves, as well as to the Abstract and the description at column 1, line 57 to column 2, line 33.
- (iii) D3 discloses a fluid pressure regulator, and more specifically such a regulator for use in a domestic gas meter installation. The pilot valve (60 in figure 1) of this

regulator is equipped with the features defined by Claim 1 for controllably driving the main valve (34). Reference is made to the Abstract.

- (iv) D4 discloses a fluid flow controlling valve (see figure 2 at page 29), the diaphragm setting of which also corresponds to the defined by Claim 1. Reference is made to the operation of this valve explained at page 29, left column, penultimate paragraph to right column of same page, first paragraph.
 - (v) D5 discloses a gas regulating valve having the characteristics defined by Claim 1 of the present application. It includes a pilot valve (1 in figure 1) controllably driving a main valve, the construction and operation of which being explained in detail in conjunction with the ratio of the diaphragms areas at page 3, line 18 to page 4, line 18.
- 1.3 D1 to D5 refer to gas control or pneumatic systems rather than specifically referring to water flow control in a water supply system. However, since at least D3 to D4 are clearly directed to fluid supply systems in general, it is considered that their disclosures is directed to both gas and liquid supply systems. Alone the mention of the intended use in Claim 1 (specifying water as the liquid) does not involve the use of some extra features, when compared with the device known from the prior art documents (see e.g. D4), which renders the claimed device specially suitable to operate with water, and which does not derive obviously from this prior art. Specific reference on this point is made to D4 (left column, third line; right column, fourth line) which explicitly discusses the use of the flow control valve disclosed thereby in a liquids supply system.
- 1.4 The subject-matter of Claim 1, which is directed to a water supply system, is therefore anticipated in its full extent at least by either D3 or D4. Claim 1 does not meet thus the requirements of novelty (Article 33(2) PCT).
- 1.5 Dependent Claims 2 to 10 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, involve an inventive step. These features are comprised in the disclosures of the above cited documents (D1 and D2 disclose the features of all dependent claims, D3 and D4 the features of Claims 2 to 7, i.e. without the second diaphragm and D5 the

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/02127

features of Claims 6 to 10). Thus the requirements set by Article 33(2) are not fulfilled by any of the dependent claims.

- 1.6 Since the application and its claims are all directed to pilot valves, the claimed subject-matter is industrially applicable (Article 33(4) PCT).

2. CONCERNING SECTION VII

- 2.1 The independent claim is not in two-part form, the first part defining the features known in the closest prior art (Rule 6.3.b(i),(ii) PCT).
- 2.2 There are no reference signs in parentheses in the claims (Rule 6.2(b) PCT).
- 2.3 In order to set out more fully the background art useful for understanding the invention, the closest prior art (see D3 to D4) should have been acknowledged in the introductory part of the description (Rule 5.1.(a)(ii) PCT).

pct2324

Claims

1. A pilot valve including
biassing means to control a gate for controlling
5 fluid flow through a control chamber;
a second chamber sealed by a second chamber diaphragm
into which control pressure is applicable for also
controlling the operation of the gate, whereby, in use, an
increase in control pressure acts to reduce fluid flow
10 through the gate;
wherein the side of the diaphragm against which the
control pressure is not applied, is in fluid communication
with the control chamber.
- 15 2. A pilot valve according to claim 1 wherein the
biassing means is biased to open the gate.
3. A pilot valve according to claim 2 wherein the
biassing means is rigidly connected to the gate by a
20 mechanical linkage.
4. A pilot valve according to claim 3 wherein the
diaphragm is rigidly connected to the gate by a mechanical
linkage.
- 25 5. A pilot valve according to claim 3 or claim 4
wherein the diaphragm is rigidly connected to the biassing

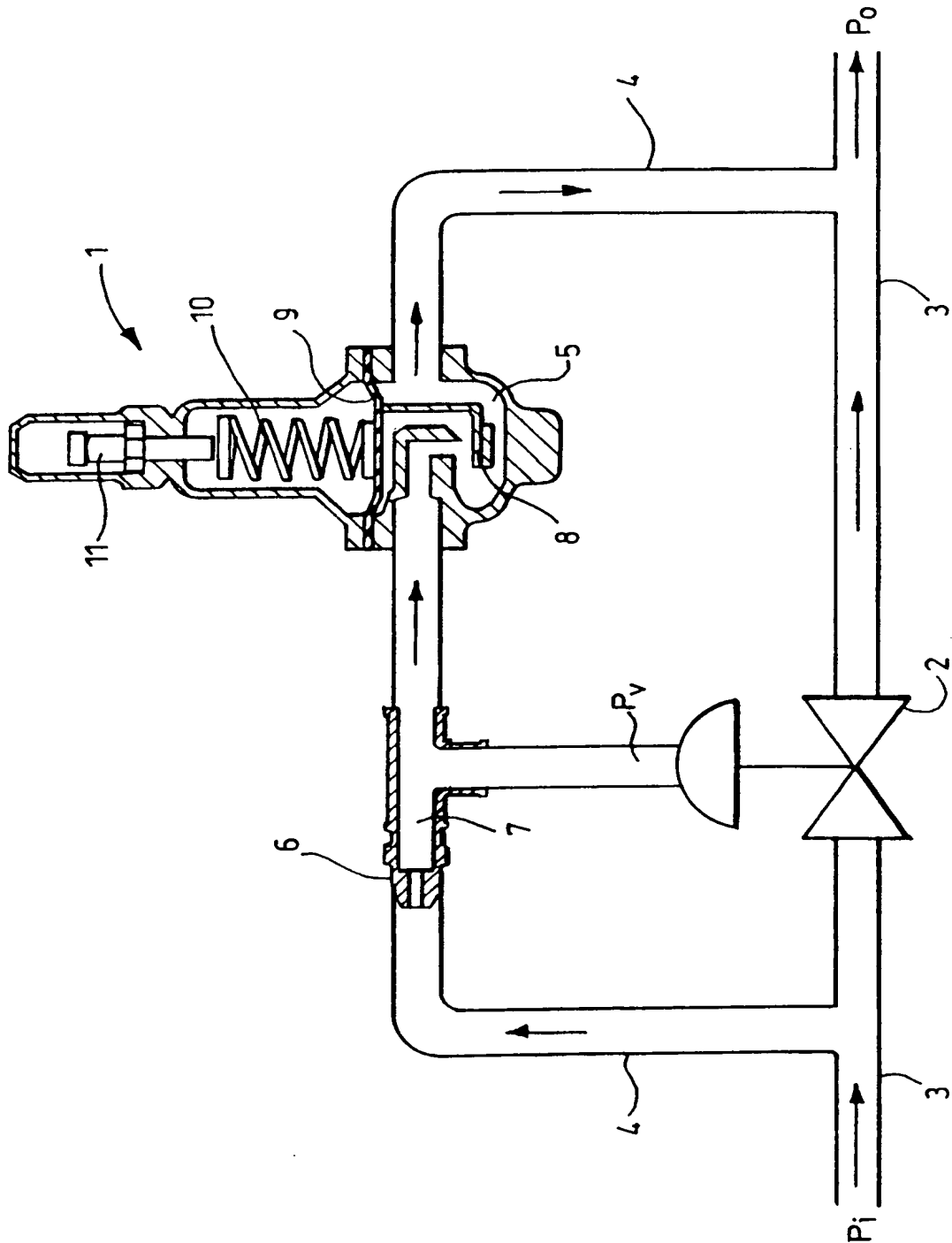


FIG.1.

2/5

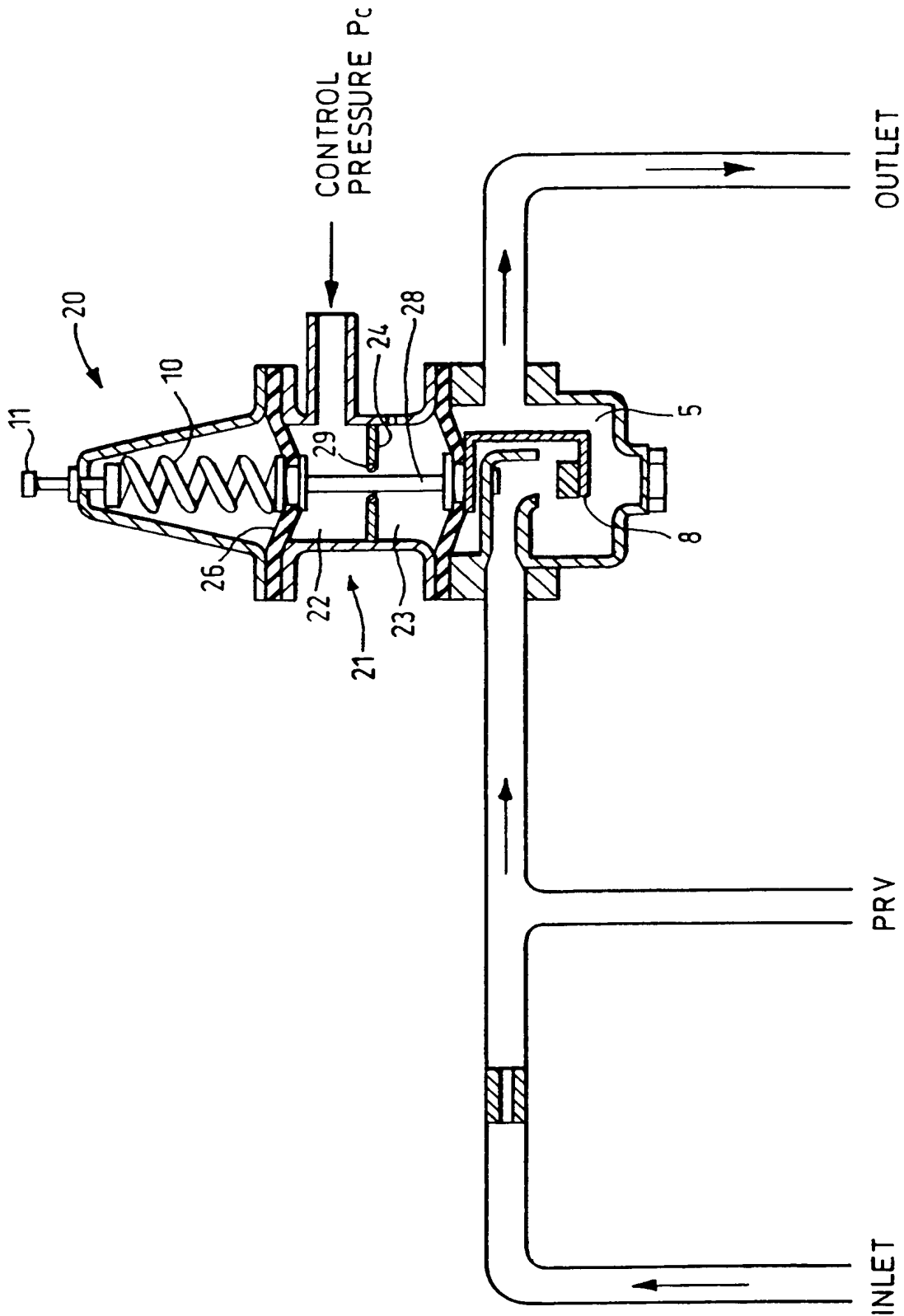


FIG.2.

3/5

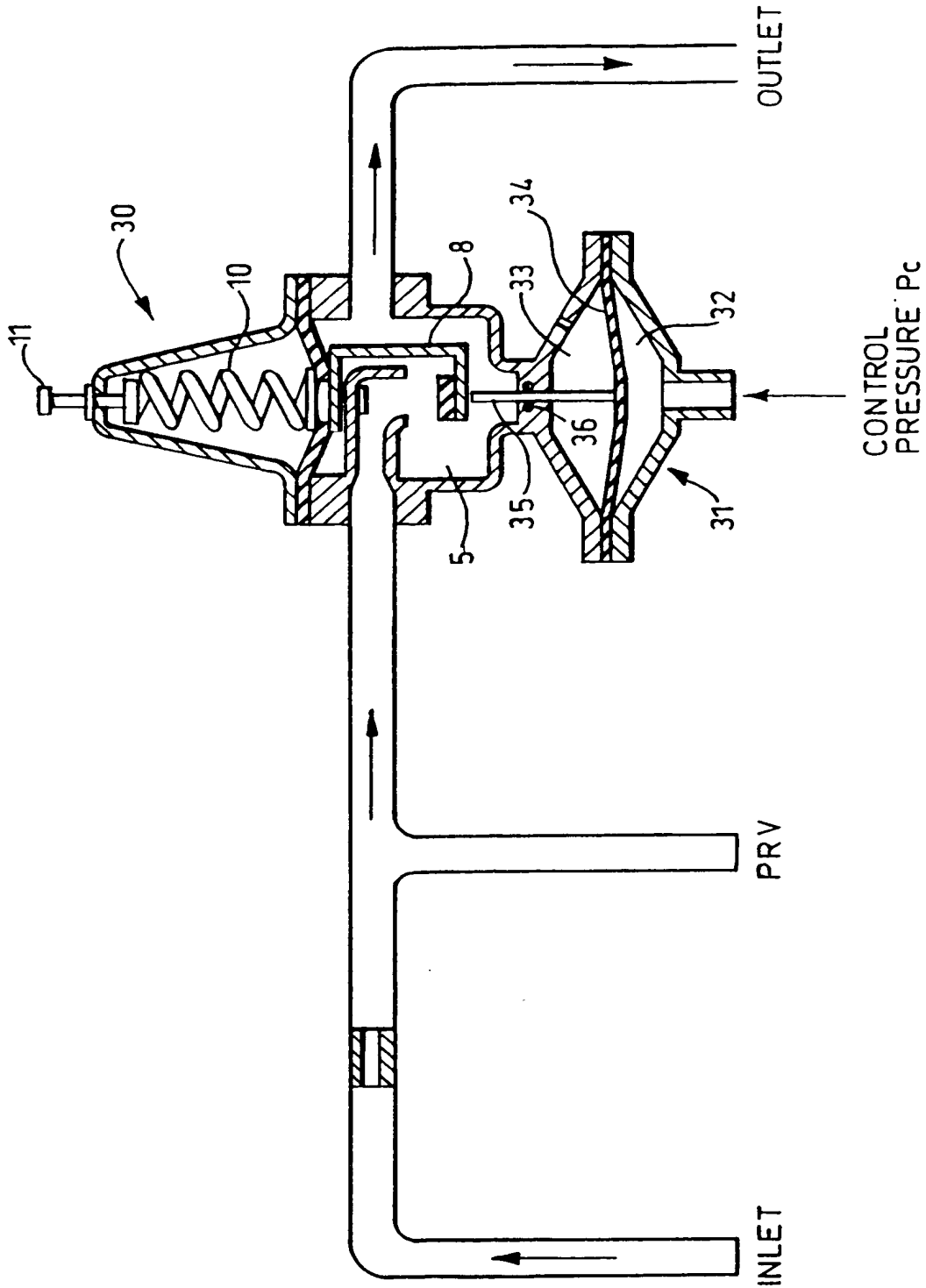
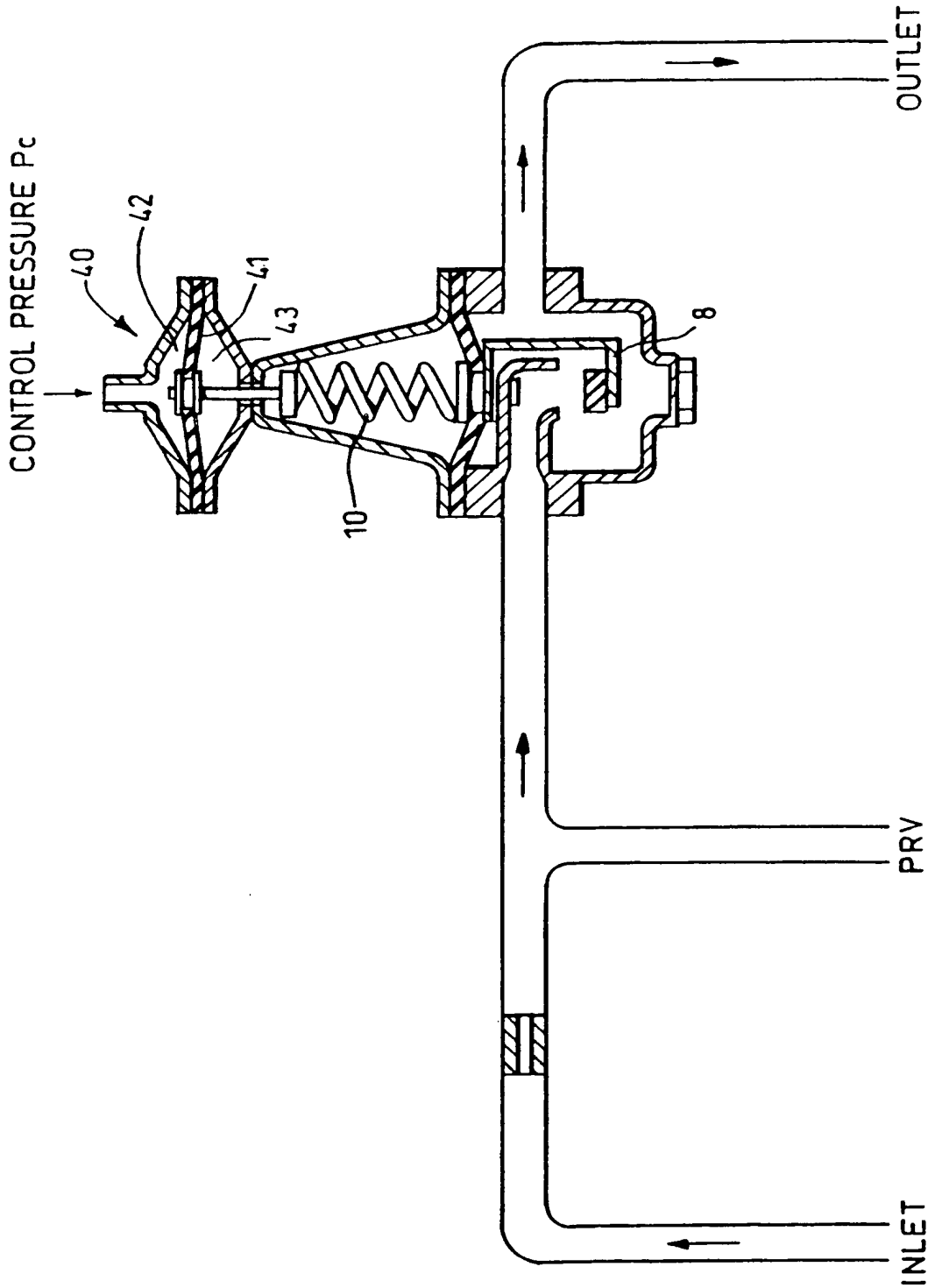


FIG.3.

4/5



5/5

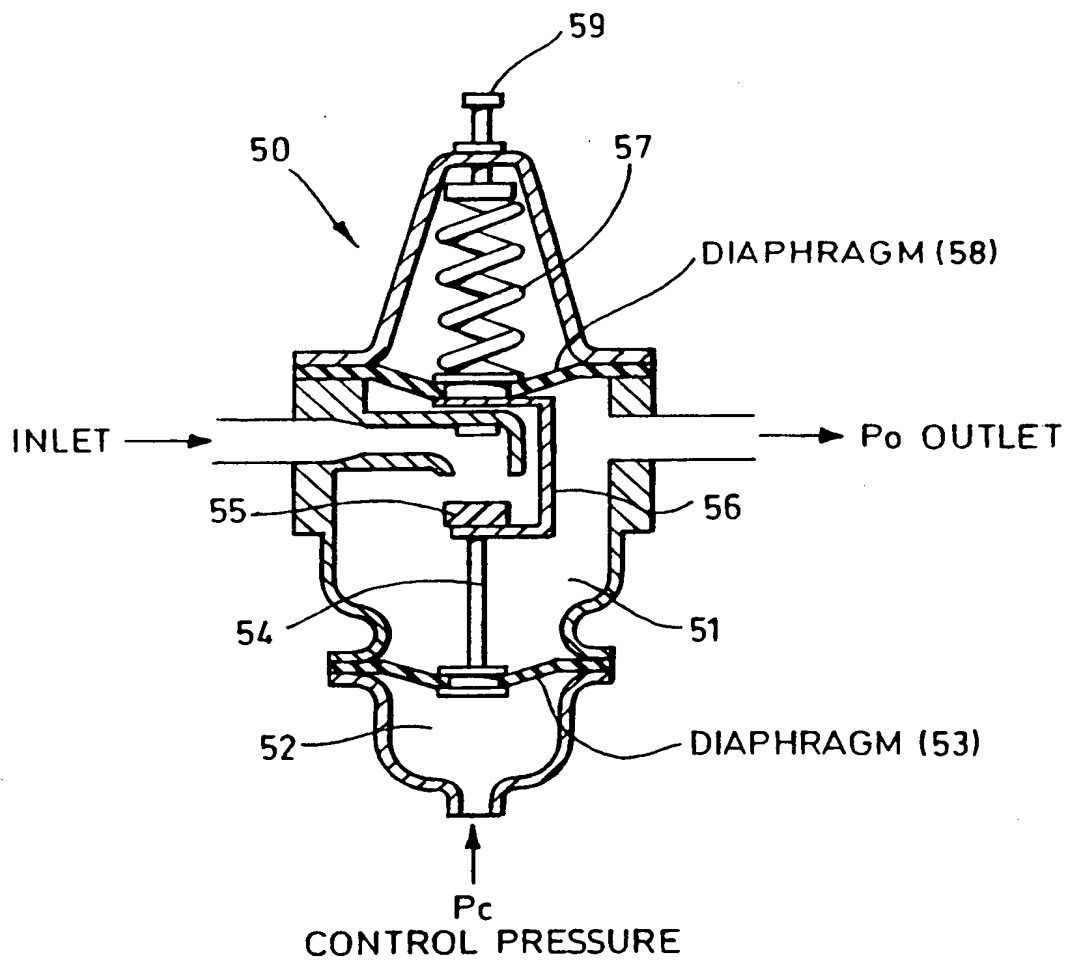


FIG.5.

PATENT COOPERATION TREATY

WO 00/75741
PCT/GB00/02127

PCT

From the INTERNATIONAL BUREAU

NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

To:

HACKNEY, Nigel, J.
Mewburn Ellis
York House
23 Kingsway
London WC2B 6HP
ROYAUME-UNI

RECEIVED

22 DEC 2000

| | | | |
|---|--|---|---|
| Date of mailing (day/month/year) 14 December 2000 (14.12.00) | | Applicant's or agent's file reference NJH/MP585604 | |
| International application No. PCT/GB00/02127 | | International filing date (day/month/year) 02 June 2000 (02.06.00) | Priority date (day/month/year) 04 June 1999 (04.06.99) |
| Applicant TECHNOLOG LIMITED et al | | | |

IMPORTANT NOTICE

- Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:
AG,AU,DZ,KP,KR,MZ,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

- The following designated Offices have waived the requirement for such a communication at this time:

**AE,AL,AM,AP,AT,AZ,BA,BB,BG,BR,BY,CA,CH,CN,CR,CU,CZ,DE,DK,DM,EA,EE,EP,ES,FI,GB,GD,
GE,GH,GM,HR,HU,ID,IL,IN,IS,JP,KE,KG,KZ,LC,LK,LR,LS,LT,LU,LV,MA,MD,MG,MK,MN,MW,MX,
NO,NZ,OA,PL,PT,RO,RU,SD,SE,SG,SI,SK,SL,TJ,TM,TR,TT,TZ,UA,UG,UZ,VN,YU,ZA,ZW**

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

- Enclosed with this Notice is a copy of the international application as published by the International Bureau on
14 December 2000 (14.12.00) under No. WO 00/75741

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

| | |
|---|--|
| <p>The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No. (41-22) 740.14.35</p> | <p>Authorized officer J. Zahra</p> <p>Telephone No. (41-22) 338.83.38</p> |
|---|--|

(19) World Intellectual Property Organization
International Bureau



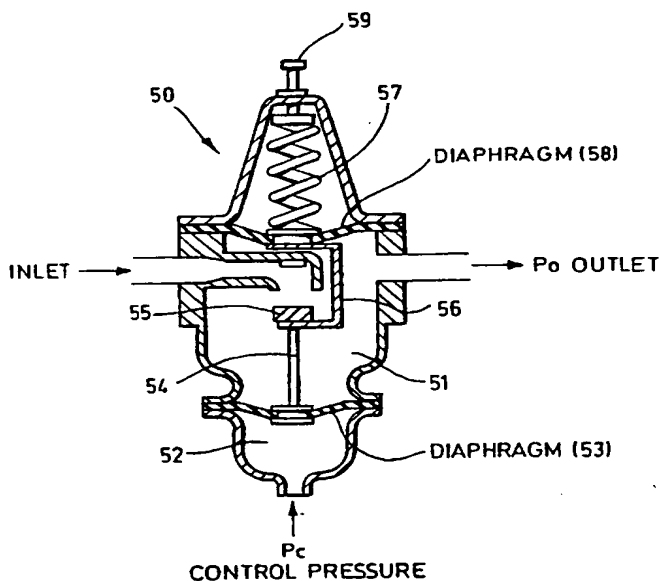
(43) International Publication Date
14 December 2000 (14.12.2000)

PCT

(10) International Publication Number
WO 00/75741 A1

- (51) International Patent Classification?: **G05D 16/16**, 16/06
- (74) Agents: **HACKNEY, Nigel, J. et al.**; Mewburn Ellis, York House, 23 Kingsway, London WC2B 6HP (GB).
- (21) International Application Number: **PCT/GB00/02127**
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (22) International Filing Date: **2 June 2000 (02.06.2000)**
- (25) Filing Language: **English**
- (26) Publication Language: **English**
- (30) Priority Data: **9913058.5** ✓ **4 June 1999 (04.06.1999)** **GB**
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- (71) Applicant (*for all designated States except US*): **TECHNOLOG LIMITED** [GB/GB]; Ravenstor Road, Wirksworth, Matlock, Derbyshire DE4 4FY (GB).
- (72) Inventor; and
- (75) Inventor/Applicant (*for US only*): **YONNET, Claude** [FR/GB]; The Home Close, 36 Edge Road, Matlock, Derbyshire DE4 3NH (GB).
- Published:
— *With international search report.*
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: **PILOT VALVE**



(57) Abstract: There is provided a pilot valve (50), suitable for use in water and gas supply systems, the valve including biasing means (57), to control a gate (55), for controlling fluid flow through a control chamber (51), and a second chamber (52), which is sealed by a diaphragm (53), the second chamber (52), in use, receiving a control pressure for controlling the operation of the gate (55), such that an increase in control pressure acts to reduce fluid flow through the gate (55). The side of the diaphragm (53), against which the control pressure is not applied, is in fluid communication with the control chamber (51).

WO 00/75741 A1

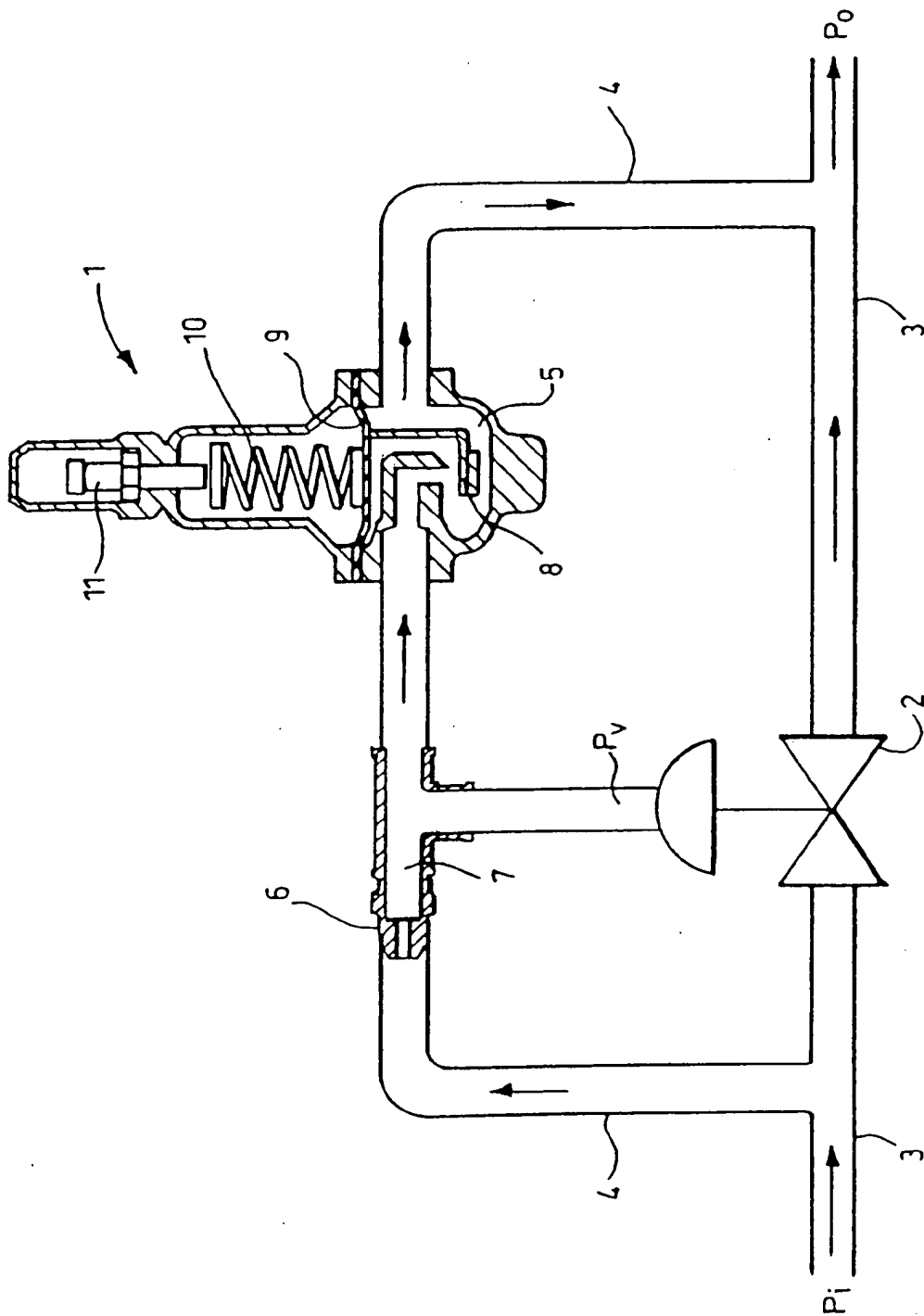


FIG.1.

2/5

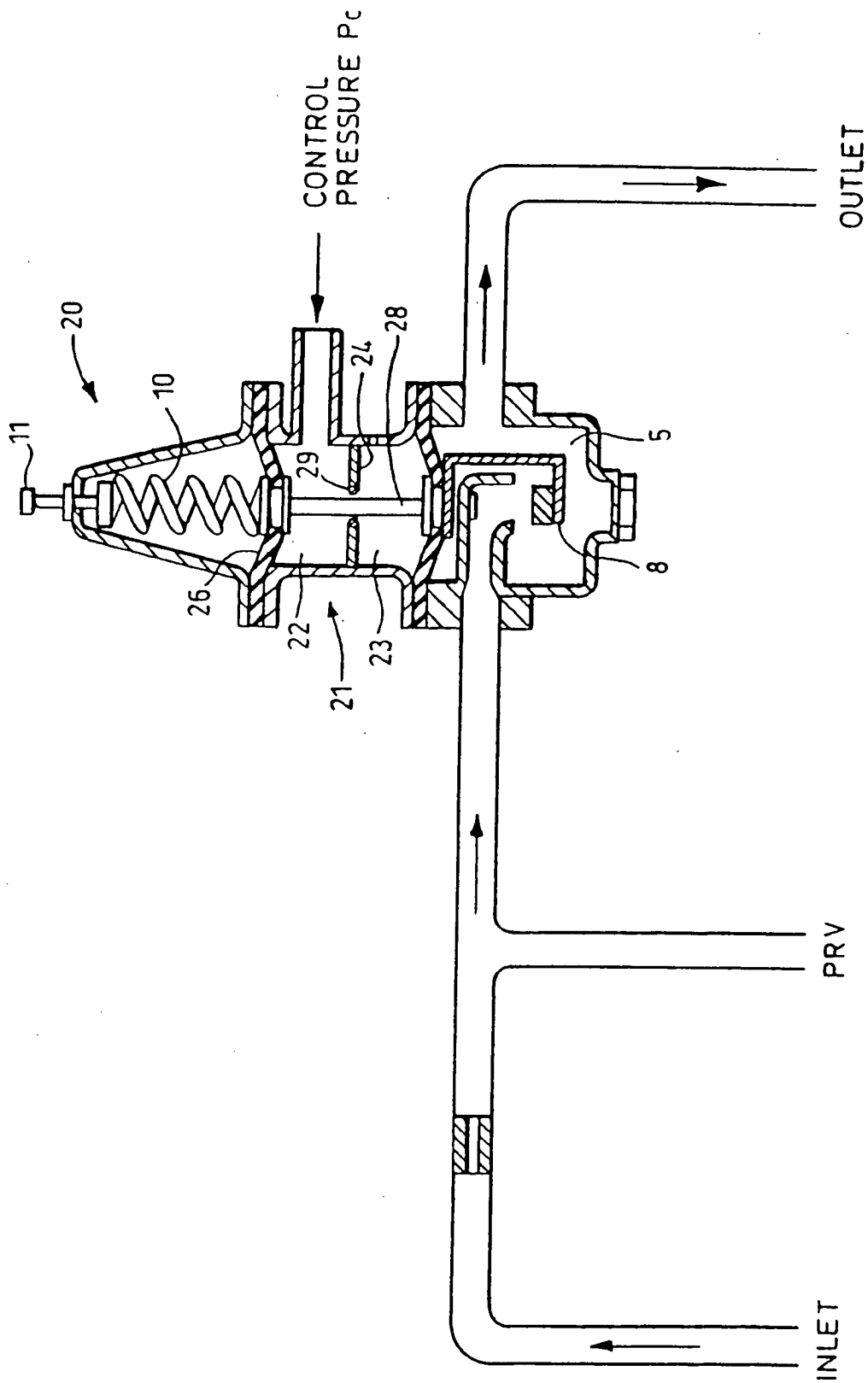


FIG.2.

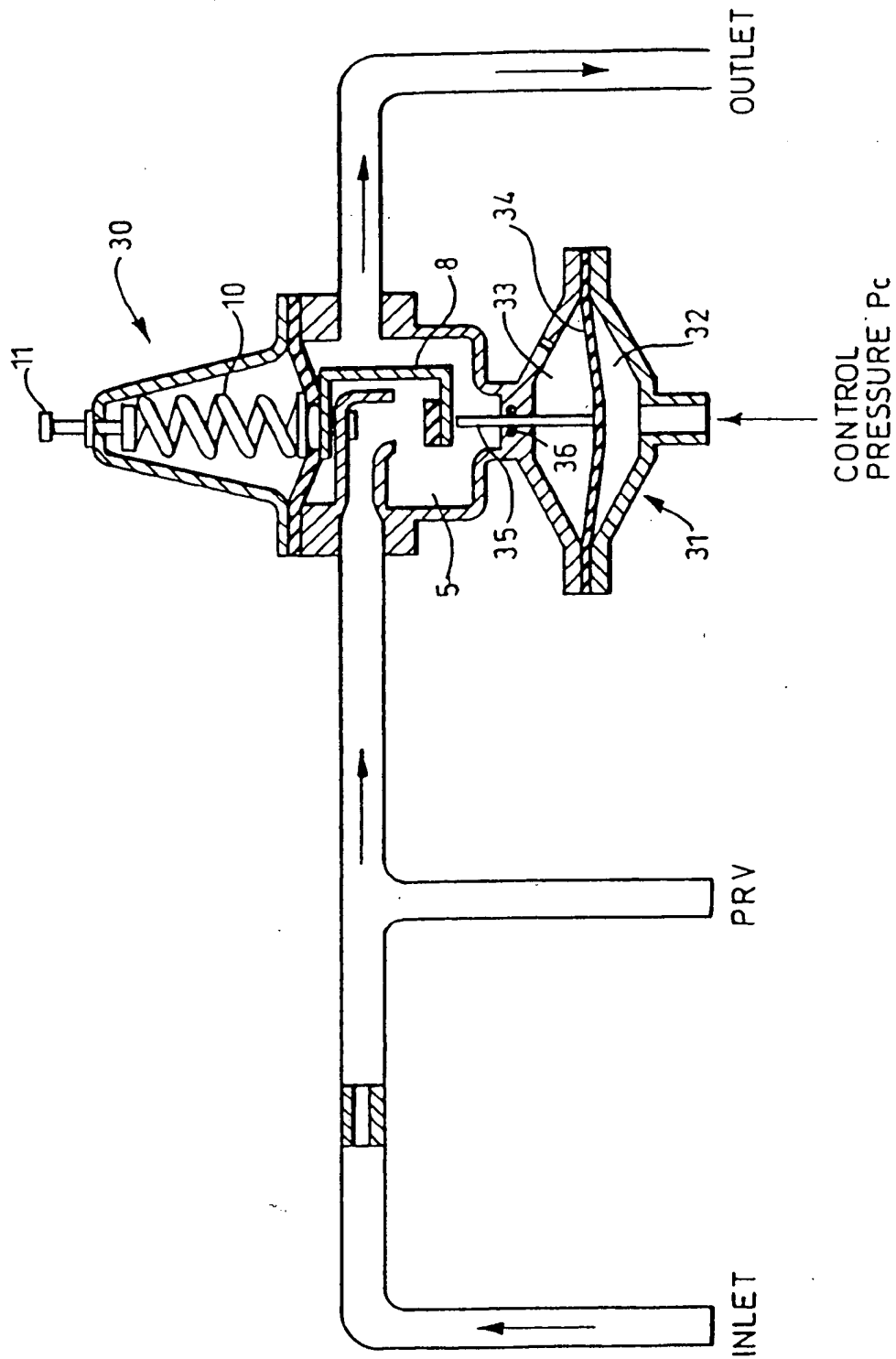


FIG.3.

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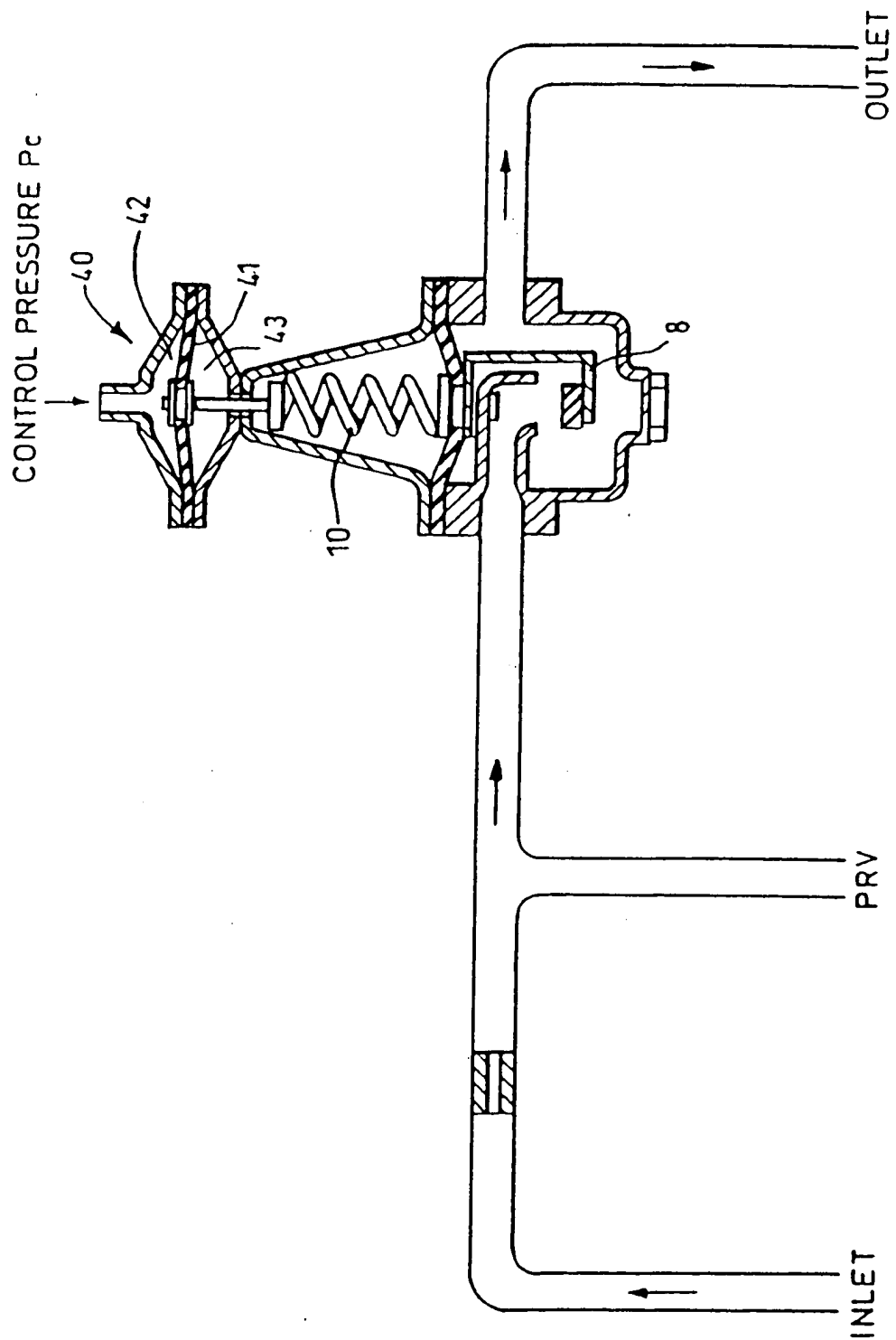


FIG.4.

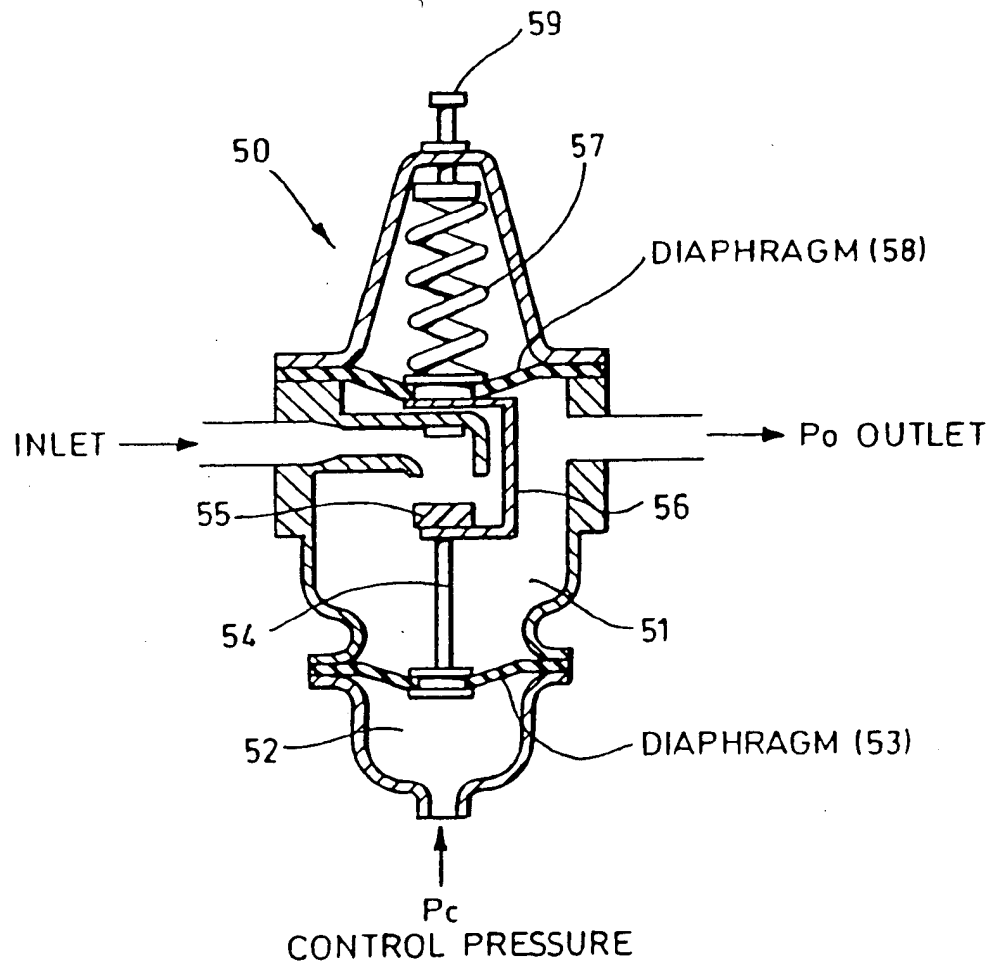


FIG.5.

INTERNATIONAL SEARCH REPORT

Int. l. Application No

PCT/GB 00/02127

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G05D16/16 G05D16/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G05D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | US 4 966 188 A (GARTNER JOSEF ET AL) 30 October 1990 (1990-10-30) the whole document | 1-10 |
| X | DE 37 41 364 A (HONEYWELL REGELSYSTEME GMBH) 15 June 1989 (1989-06-15) the whole document | 1-10 |
| X | GB 2 284 687 A (DELTA FLUID PRODUCTS LTD) 14 June 1995 (1995-06-14) figure 1 | 1-7 |
| | -/- | |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

13 September 2000

Date of mailing of the international search report

26/09/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.
Fax: (+31-70) 340-3016

Authorized officer

Philippot, 8

PATENT COOPERATION TREATY

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
HACKNEY NIGEL J
Mewburn Ellis
York House
23 Kingsway
London WC2B 6HP
GRANDE BRETAGNE

RECEIVED

20 MAR 2001

| | |
|-------------------------------|-------------------------|
| DUE 20.06.01 EXTD JH | ENT'D FOR NJH PCT |
| TO I. | 2. |

WRITTEN OPINION

(PCT Rule 66)

| | |
|-------------------------------------|------------|
| Date of mailing (day/month/year) | 20.03.2001 |
|-------------------------------------|------------|

Applicant's or agent's file reference
NJH/MP5856604

REPLY DUE **within 3 month(s)**
from the above date of mailing

International application No.
PCT/GB00/02127

International filing date (day/month/year)
02/06/2000

Priority date (day/month/year)
04/06/1999

International Patent Classification (IPC) or both national classification and IPC
G05D16/16

Applicant
TECHNOLOG LIMITED et al.

1. This written opinion is the **first** drawn up by this International Preliminary Examining Authority.
2. This opinion contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain document cited
 - VII ☒ Certain defects in the international application
 - VIII ☐ Certain observations on the international application
3. The applicant is hereby **invited to reply** to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also: For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.
4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 04/10/2001.

Name and mailing address of the international preliminary examining authority:

European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer / Examiner
De Syllas, D

Formalities officer (incl. extension of time limits)
Corcos, E
Telephone No. +49 89 2399 7418



WRITTEN OPINION

International application No. PCT/GB00/02127

I. Basis of the opinion

1. This opinion has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".*):

Description, pages:

1-11 as originally filed

Claims, No.:

1-10 as originally filed

Drawings, sheets:

1/5-5/5 as received on 14/08/2000

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

WRITTEN OPINION

International application No. PCT/GB00/02127

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N) Claims 1-10

Inventive step (IS) Claims

Industrial applicability (IA) Claims

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

1. CONCERNING SECTION V

1.1 Reference is made to the following documents:

- D1: US-A-4 966 188 (GARTNER JOSEF ET AL) 30 October 1990 (1990-10-30)
- D2: DE 37 41 364 A (HONEYWELL REGELSYSTEME GMBH) 15 June 1989 (1989-06-15)
- D3: GB-A-2 284 687 (DELTA FLUID PRODUCTS LTD) 14 June 1995 (1995-06-14)
- D4: WKS: 'Automatischer Durchflussregler' TECHNISCHE RUNDSCHAU., vol. 62, no. 44, 16 October 1970 (1970-10-16), page 29 XP002147281 HALLWAG VERLAG. BERN., CH ISSN: 1023-0823
- D5: FR-A-1 582 851 (FISHER GOVERNOR COMPANY) 10 October 1969 (1969-10-10)

- 1.2** D1 discloses a pilot valve for controlling fluid flow through a control chamber, which includes biasing means (15 in the sole figure of D1) to control a gate, a second chamber and a second diaphragm with the specifications defined by Claim 1. Reference is made to the sole figure, to the Abstract, to the passage at column 1, line 41 to column 2, line 10 and to column 37 to 67 describing the controller (3) and its operation.

The subject-matter of Claim 1 is therefore anticipated by D1 and thus Claim 1 does not meet the requirements of Article 33(2) PCT.

- 1.3** The subject-matter presently claimed appears to be well-known in the art, since, further to the prior art comprised by D1, the one of D2 to D5 is also found to be covered by the definition provided by Claim 1 (Article 33(2)PCT).

D2 discloses a pneumatic amplifier presenting the constructional features referring to the biasing means, the second chamber and the diaphragm settings defined by Claim 1. Reference is made to the two chambers (24, 26) and the two diaphragms (A1, A2) shown in figure 1 in connection with the common shaft (32) and the associated valves, as well as to the Abstract and the description at

column 1, line 57 to column 2, line 33.

D3 discloses a fluid pressure regulator, the pilot valve (60 in figure 1) of which is equipped with the features defined by Claim 1 for controllably driving the main valve (34). Reference is made to the Abstract.

D4 discloses a fluid flow controlling valve (see figure 2 at page 29), the diaphragm setting of which also corresponds to the defined by Claim 1. Reference is made to the operation of this valve explained at page 29, left column, penultimate paragraph to right column of same page, first paragraph.

D5 discloses a gas regulating valve having the characteristics defined by Claim 1 of the present application. It includes a pilot valve (1 in figure 1) controllably driving a main valve, the construction and operation of which being explained in detail in conjunction with the ratio of the diaphragms areas at page 3, line 18 to page 4, line 18.

1.4 Dependent Claims 2 to 10 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, involve an inventive step. These features are comprised in the disclosures of the above cited documents (D1 and D2 disclose the features of all dependent claims, D3 and D4 the features of Claims 2 to 7, i.e. without the second diaphragm and D5 the features of Claims 6 to 10). Thus the requirements set by Article 33(2) are not fulfilled by any of the dependent claims.

1.5 Since the application and its claims are all directed to pilot valves, the claimed subject-matter is industrially applicable (Article 33(4) PCT).

2. CONCERNING SECTION VII

2.1 The independent claims are not in two-part form, the first part defining the features known in the closest prior art document D1 (Rule 6.3.b(i),(ii) PCT).

**WRITTEN OPINION
SEPARATE SHEET**

International application No. PCT/GB00/02127

2.2 There are no reference signs in parentheses in the claims (Rule 6.2(b) PCT).

2.3 In order to set out more fully the background art useful for understanding the invention, the closest prior art (see D1 to D5) should have been acknowledged in the introductory part of the description (Rule 5.1.(a)(ii) PCT).

pct2982

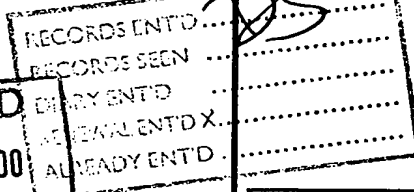
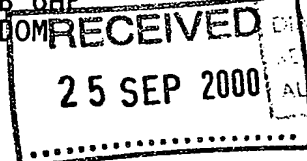
PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

Mewburn Ellis
Attn. HACKNEY NIGEL J
York House
23 Kingsway
London WC2B 6HP
UNITED KINGDOM



NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT
OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing
(day/month/year) 26/09/2000

Applicant's or agent's file reference

NJH/MP5858604

FOR FURTHER ACTION

See paragraphs 1 and 4 below

International application No.

PCT/GB 00/ 02127

International filing date

(day/month/year) 02/06/2000

Applicant

TECHNOLOG LIMITED

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau.

If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority



European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Mustafa Corapci

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| | | |
|---|---|--|
| Applicant's or agent's file reference NJH/MP5858604 | FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below. | |
| International application No. PCT/GB 00/ 02127 | International filing date (day/month/year) 02/06/2000 | (Earliest) Priority Date (day/month/year) 04/06/1999 |
| Applicant TECHNOLOG LIMITED | | |

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of Invention is lacking** (see Box II).

4. With regard to the **title**,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

5



as suggested by the applicant.



None of the figures.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/02127

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G05D16/16 G05D16/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G05D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | US 4 966 188 A (GARTNER JOSEF ET AL) 30 October 1990 (1990-10-30) the whole document --- | 1-10 |
| X | DE 37 41 364 A (HONEYWELL REGELSYSTEME GMBH) 15 June 1989 (1989-06-15) the whole document --- | 1-10 |
| X | GB 2 284 687 A (DELTA FLUID PRODUCTS LTD) 14 June 1995 (1995-06-14) figure 1 --- -/- | 1-7 |

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"Z" document member of the same patent family

Date of the actual completion of the international search

13 September 2000

Date of mailing of the international search report

26/09/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Philippot, B

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/02127

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | WKS: "Automatischer Durchflussregler" TECHNISCHE RUNDSCHAU., vol. 62, no. 44, 16 October 1970 (1970-10-16), page 29 XP002147281 HALLWAG VERLAG. BERN., CH ISSN: 1023-0823 the whole document --- | 1-7 |
| X | FR 1 582 851 A (FISHER GOVERNOR COMPANY) 10 October 1969 (1969-10-10) | 1,6-10 |
| A | page 2 -page 3 figures 1,2,4 ----- | 2-5 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/02127

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---------------------|---|--|
| US 4966188 A | 30-10-1990 | DE 3828002 A GB 2223109 A,B IT 1231495 B NL 8902084 A,B, | 22-02-1990 28-03-1990 07-12-1991 16-03-1990 |
| DE 3741364 A | 15-06-1989 | NONE | |
| GB 2284687 A | 14-06-1995 | NONE | |
| FR 1582851 A | 10-10-1969 | NONE | |

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference NJH/MP5856604
(if desired) (12 characters maximum)

Box No. I TITLE OF INVENTION PILOT VALVE

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

TECHNOLOG LIMITED
RAVENSTOR ROAD
WIRKSWORTH
MATLOCK
DERBYSHIRE
DE4 4FY

UNITED KINGDOM

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (that is, country) of nationality: GB

State (that is, country) of residence: GB

This person is applicant for the purposes of:

☐

all designated States

☒

all designated States except the United States of America

☐

the United States of America only

☐

the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

YONNET CLAUDE
THE HOME CLOSE
36 EDGE ROAD
MATLOCK
DERBYSHIRE
DE4 3NH

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (if this check-box is marked, do not fill in below.)

State (that is, country) of nationality: FR

State (that is, country) of residence: GB

This person is applicant for the purposes of:

☐

all designated

☐

all designated States except the United States of America

☒

the United States of America only

☐

the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒

agent

☐

common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

HACKNEY, NIGEL J. and others
MEWBURN ELLIS
YORK HOUSE
23 KINGSWAY
LONDON WC2B 6HP
GB

Telephone No. 0161 834 0201

Facsimile No. +44 20 7240 9339

Teleprinter No.

☐ Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. V

DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

- ☒ AP ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ EA Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ EP European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ OA OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection desired, specify on dotted line):

- | | |
|--|--|
| <input checked="" type="checkbox"/> AE United Arab Emirates | <input checked="" type="checkbox"/> LT Lithuania |
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> LU Luxembourg |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> LV Latvia |
| <input checked="" type="checkbox"/> AT Austria | <input checked="" type="checkbox"/> MA Morocco |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> MD Republic of Moldova |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> MG Madagascar |
| <input checked="" type="checkbox"/> BA Bosnia & Herzegovina | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input checked="" type="checkbox"/> BB Barbados | |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> MN Mongolia |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> MX Mexico |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> NO Norway |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> CR Costa Rica | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> CZ Czech Republic | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> DE Germany | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> DK Denmark | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> DM Dominica | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> EE Estonia | <input checked="" type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> SK Slovakia |
| <input checked="" type="checkbox"/> FI Finland | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> GD Grenada | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> GE Georgia | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> GH Ghana | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> TZ Tanzania |
| <input checked="" type="checkbox"/> HR Croatia | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> IL Israel | |
| <input checked="" type="checkbox"/> IN India | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> IS Iceland | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> JP Japan | <input checked="" type="checkbox"/> YU Yugoslavia |
| <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> ZA South Africa |
| <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet: |
| <input checked="" type="checkbox"/> KR Republic of Korea | <input checked="" type="checkbox"/> DZ Algeria |
| <input checked="" type="checkbox"/> KZ Kazakstan | <input checked="" type="checkbox"/> AG Antigua and Barbuda |
| <input checked="" type="checkbox"/> LC St Lucia | <input checked="" type="checkbox"/> MZ Mozambique |
| <input checked="" type="checkbox"/> LK Sri Lanka | |
| <input checked="" type="checkbox"/> LR Liberia | |
| <input checked="" type="checkbox"/> LS Lesotho | <input checked="" type="checkbox"/> Any other state which is party to the PCT |

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

Supplemental Box*If the Supplemental Box is not used, this sheet need not be included in the request.**Use this box in the following cases:***1.** *If, in any of the Boxes, the space is insufficient to furnish all the information:**in particular:*

- (i) *if more than two persons are involved as applicants and/or inventors and no "continuation sheet" is available:*
- (ii) *if, in Box No. II or in any of the sub-boxes of Box No. III, the indication "the States indicated in the Supplemental Box" is checked:*
- (iii) *if, in Box No. II or in any of the sub-boxes of Box No. III, the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America:*
- (iv) *if, in addition to the agent(s) indicated in Box No. IV, there are further agents:*
- (v) *if, in Box No. V, the name of any State (or OAPI) is accompanied by the indication "patent of addition," or "certificate of addition," or if, in Box No. V, the name of the United States of America is accompanied by an indication "Continuation" or "Continuation-in-part":*
- (vi) *if, in Box No. VI, there are more than three earlier applications whose priority is claimed:*
- (vii) *if, in Box No. VI, the earlier application is an ARIPO application:*

*In such case, write "Continuation of Box No. ..." (indicate the number of the Box) and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient;**in such case, write "Continuation of Box III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this box is the applicant's state (that is, country) of residence if no state of residence is indicated below;**in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant;**in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor;**in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;**in such case, write "Continuation of Box No. V" and the name of each State involved (or OAPI), and after the name of each such State (or OAPI), the number of the parent title or parent application and the date of grant of the parent title or filing of the parent application;**in such case, write "Continuation of Box No. VI" and indicate for each additional earlier application the same type of information as required in Box No. VI.**in such case, write "Continuation of Box No. VI", specify the number of the item corresponding to that earlier application and indicate at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed.***2.** *If, with regard to the precautionary designation statement contained in Box No. V, the applicant wishes to exclude any State(s) from the scope of that statement:**in such case, write "Designation(s) excluded from precautionary designation statement" and indicate the name or two-letter code of each state so excluded.***3.** *If the applicant claims, in respect of any designated Office, the benefits of provisions of the national law concerning non-prejudicial disclosures or exceptions to lack of novelty:**in such case, write "Statement Concerning Non-Prejudicial Disclosures or Exceptions to Lack of Novelty" and furnish that statement below.***Continuation of Box IV**

| | |
|----------------------|-----------------------|
| ARMITAGE, IAN M. | PAGET, HUGH C.E. |
| BRASNETT, ADRIAN H. | SANDERSON, MICHAEL J. |
| CALDERBANK, T. ROGER | STONER, G. PATRICK |
| CARTER, STEPHEN | STUART, IAN |
| COLEIRO, RAYMOND | WALTON, SEÁN M |
| CRIPPS, JOANNA E | WATSON, ROBERT J. |
| FORD, MICHAEL F. | |
| HACKNEY, NIGEL J. | |
| HARRISON, DAVID C. | |
| KIDDLE, SIMON J. | |
| KREMER, SIMON M. | |
| LYONS, JUNE, M. | |
| NICHOLLS, KATHRYN M. | |

Continuation of Box No. ?

| | | | | | |
|---|----------------------------------|--|---|--|--|
| Box No. VI | | PRIORITY CLAIM | | <input type="checkbox"/> Further priority claims are indicated in the Supplemental Box | |
| Filing date of earlier application (day/month/year) | Number of earlier application | Where earlier application is: | | | |
| | | national application: country | regional application:* regional Office | international application: receiving Office | |
| item (1) 4 JUNE 1999 (4.06.99) | 9913058.5 | GB | | | |
| item (2) | | | | | |
| item (3) | | | | | |
| <input checked="" type="checkbox"/> The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s): <u>Item (1) - Form 23/77 attached</u> | | | | | |
| <small>* Where the earlier application is an ARIPO application, it is mandatory to indicate in the supplemental box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.</small> | | | | | |
| Box No. VII INTERNATIONAL SEARCHING AUTHORITY | | | | | |
| Choice of International Searching Authority (ISA) <small>(If two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):</small> | | Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority): | | | |
| ISA / | | Date (day/month/year) Number Country (or regional Office) | | | |
| Box No. VIII CHECK LIST; LANGUAGE OF FILING | | | | | |
| This international application contains the following number of sheets: request :4 description (excluding sequence listing part) :11 claims :2 abstract :1 drawings :5 sequence listing part of description :0 Total number of sheets :23 | | This international application is accompanied by the item(s) marked below: 1. <input checked="" type="checkbox"/> fee calculation sheet 2. <input type="checkbox"/> separate signed power of attorney 3. <input checked="" type="checkbox"/> copy of general power of attorney; reference number, if any: 4. <input type="checkbox"/> statement explaining lack of signature 5. <input checked="" type="checkbox"/> priority document(s) identified in Box No. VI as item(s): 6. <input type="checkbox"/> translation of international application into (language): 7. <input type="checkbox"/> separate indications concerning deposited microorganisms or other biological matter 8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form 9. <input checked="" type="checkbox"/> other (specify): | | | |
| Figure of the drawings which should accompany the abstract 5 | | Language of filing of the international application: ENGLISH | | | |
| Box No. IX SIGNATURE OF APPLICANT OR AGENT | | | | | |
| Next to each signature indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request). | | | | | |
| HACKNEY, NIGEL J. APPOINTED AGENT | | | | | |

For receiving Office use only

| | | |
|---|---|--|
| 1. Date of actual receipt of the purported international application: | | 2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received: |
| 3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application: | | |
| 4. Date of timely receipt of the required corrections under PCT Article 11(2): | | |
| 5. International Searching Authority (if two or more are competent): ISA/ | 6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid | |

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

PCT

FEE CALCULATION SHEET

Annex to the Request

For receiving Office use only

International application No.

Applicant's or agent's
file reference

NJH/MP5856604

Date stamp of the receiving
Office

Applicant **TECHNOLOG LIMITED**

CALCULATION OF PRESCRIBED FEES

1. TRANSMITTAL FEE..... £55 **T**

2. SEARCH FEE £605 **S**

International search to be carried out by _____
(If two or more International Searching Authorities are competent in relation to the international application,
indicate the name of the Authority which is chosen to carry out the international search.)

3. INTERNATIONAL FEE

Basic Fee

The international application contains 23 sheets.

first 30 sheets £264 **b₁**

_____ x _____ = _____ **b₂**

remaining sheets additional amount

Add amounts entered at b₁ and b₂ and enter total at B.... £264 **B**

Designation Fees

The international application contains 81 designations.

8 x £56 = £448 **D**

number of designation fees amount of designation fee
payable (maximum 8)

Add amounts entered at B and D and enter total at I.....

£712 **I**

(Applicants from certain States are entitled to a reduction of 75% of the
international fee. Where the applicant is (or all applicants are) so entitled, the
total to be entered at I is 25% of the sum of the amounts entered at B and D.)

4. FEE FOR PRIORITY DOCUMENT (if applicable) £22 **P**

5. TOTAL FEES PAYABLE

Add amounts entered at T, S, I and P, and enter total in the TOTAL box

£1394

TOTAL

☐ The designation fees are not paid at this time.

MODE OF PAYMENT

☐ authorization to charge
deposit account (see below)

☐ bank draft

☐ coupons

☒ cheque

☐ cash

☐ other (specify)

☐ postal money order

☐ revenue stamps

DEPOSIT ACCOUNT AUTHORIZATION (this mode of payment may not be available at all receiving Offices)

The RO/ _____ ☐ is hereby authorized to charge the total fee indicated above to my deposit account.

☐ is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to
my deposit account.

☐ is hereby authorized to charge the fee for preparation and transmittal of the priority document to the
International Bureau of WIPO to my deposit account.

Deposit Account Number _____ Day (day/month/year) _____

Signature _____

PATENT COOPERATION TREATY

PCT

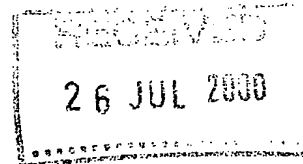
NOTIFICATION OF RECEIPT OF
RECORD COPY

(PCT Rule 24.2(a))

From the INTERNATIONAL BUREAU

To:

HACKNEY, Nigel, J.
Mewburn Ellis
York House
23 Kingsway
London WC2B 6HP
ROYAUME-UNI



| | |
|---|---|
| Date of mailing (day/month/year) 18 July 2000 (18.07.00) | IMPORTANT NOTIFICATION |
| Applicant's or agent's file reference NJH/MP585604 | International application No. PCT/GB00/02127 |

The applicant is hereby notified that the International Bureau has received the record copy of the international application as detailed below.

Name(s) of the applicant(s) and State(s) for which they are applicants:

TECHNOLOG LIMITED (for all designated States except US)
YONNET, Claude (for US)

International filing date : 02 June 2000 (02.06.00)
Priority date(s) claimed : 04 June 1999 (04.06.99)
Date of receipt of the record copy
by the International Bureau : 28 June 2000 (28.06.00)
List of designated Offices :

AP : GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW

EA : AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

EP : AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE

OA : BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

National : AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES,
FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ,
VN, YU, ZA, ZW

ATTENTION

The applicant should carefully check the data appearing in this Notification. In case of any discrepancy between these data and the indications in the international application, the applicant should immediately inform the International Bureau.

In addition, the applicant's attention is drawn to the information contained in the Annex, relating to:

- ☒ time limits for entry into the national phase
☐ confirmation of precautionary designations
☒ requirements regarding priority documents

A copy of this Notification is being sent to the receiving Office and to the International Searching Authority.

| | |
|--|---|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. (41-22) 740.14.35 | Authorized officer: I. Britel Telephone No. (41-22) 338.83.38 |
|--|---|

INFORMATION ON TIME LIMITS FOR ENTERING THE NATIONAL PHASE

The applicant is reminded that the "national phase" must be entered before each of the designated Offices indicated in the Notification of Receipt of Record Copy (Form PCT/IB/301) by paying national fees and furnishing translations, as prescribed by the applicable national laws.

The time limit for performing these procedural acts is **20 MONTHS** from the priority date or, for those designated States which the applicant elects in a demand for international preliminary examination or in a later election, **30 MONTHS** from the priority date, provided that the election is made before the expiration of 19 months from the priority date. Some designated (or elected) Offices have fixed time limits which expire even later than 20 or 30 months from the priority date. In other Offices an extension of time or grace period, in some cases upon payment of an additional fee, is available.

In addition to these procedural acts, the applicant may also have to comply with other special requirements applicable in certain Offices. **It is the applicant's responsibility** to ensure that the necessary steps to enter the national phase are taken in a timely fashion. Most designated Offices do not issue reminders to applicants in connection with the entry into the national phase.

For detailed information about the procedural acts to be performed to enter the national phase before each designated Office, the applicable time limits and possible extensions of time or grace periods, and any other requirements, see the relevant Chapters of Volume II of the PCT Applicant's Guide. Information about the requirements for filing a demand for international preliminary examination is set out in Chapter IX of Volume I of the PCT Applicant's Guide.

GR and ES became bound by PCT Chapter II on 7 September 1996 and 6 September 1997, respectively, and may, therefore, be elected in a demand or a later election filed on or after 7 September 1996 and 6 September 1997, respectively, regardless of the filing date of the international application. (See second paragraph above.)

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

CONFIRMATION OF PRECAUTIONARY DESIGNATIONS

This notification lists only specific designations made under Rule 4.9(a) in the request. It is important to check that these designations are correct. Errors in designations can be corrected where precautionary designations have been made under Rule 4.9(b). The applicant is hereby reminded that any precautionary designations may be confirmed according to Rule 4.9(c) before the expiration of 15 months from the priority date. If it is not confirmed, it will automatically be regarded as withdrawn by the applicant. There will be no reminder and no invitation. Confirmation of a designation consists of the filing of a notice specifying the designated State concerned (with an indication of the kind of protection or treatment desired) and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.

REQUIREMENTS REGARDING PRIORITY DOCUMENTS

For applicants who have not yet complied with the requirements regarding priority documents, the following is recalled.

Where the priority of an earlier national, regional or international application is claimed, the applicant must submit a copy of the said earlier application, certified by the authority with which it was filed ("the priority document") to the receiving Office (which will transmit it to the International Bureau) or directly to the International Bureau, before the expiration of 16 months from the priority date, provided that any such priority document may still be submitted to the International Bureau before that date of international publication of the international application, in which case that document will be considered to have been received by the International Bureau on the last day of the 16-month time limit (Rule 17.1(a)).

Where the priority document is issued by the receiving Office, the applicant may, instead of submitting the priority document, request the receiving Office to prepare and transmit the priority document to the International Bureau. Such request must be made before the expiration of the 16-month time limit and may be subjected by the receiving Office to the payment of a fee (Rule 17.1(b)).

If the priority document concerned is not submitted to the International Bureau or if the request to the receiving Office to prepare and transmit the priority document has not been made (and the corresponding fee, if any, paid) within the applicable time limit indicated under the preceding paragraphs, any designated State may disregard the priority claim, provided that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity to furnish the priority document within a time limit which is reasonable under the circumstances.

Where several priorities are claimed, the priority date to be considered for the purposes of computing the 16-month time limit is the filing date of the earliest application whose priority is claimed.

PATENT COOPERATION TREATY

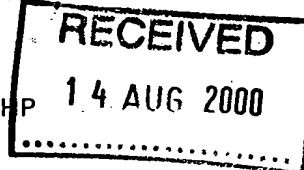
PCT

NOTIFICATION CONCERNING
SUBMISSION OR TRANSMITTAL
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

From the INTERNATIONAL BUREAU

To:

HACKNEY, Nigel, J.
Mewburn Ellis
York House
23 Kingsway
London WC2B 6HP
ROYAUME-UNI

| | |
|--|---|
| Date of mailing (day/month/year) 28 July 2000 (28.07.00) | |
| Applicant's or agent's file reference NJH/MP585604 | IMPORTANT NOTIFICATION |
| International application No. PCT/GB00/02127 | International filing date (day/month/year) 02 June 2000 (02.06.00) |
| International publication date (day/month/year) Not yet published | Priority date (day/month/year) 04 June 1999 (04.06.99) |
| Applicant TECHNOLOG LIMITED et al | |

1. The applicant is hereby notified of the date of receipt (except where the letters "NR" appear in the right-hand column) by the International Bureau of the priority document(s) relating to the earlier application(s) indicated below. Unless otherwise indicated by an asterisk appearing next to a date of receipt, or by the letters "NR", in the right-hand column, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).
2. This updates and replaces any previously issued notification concerning submission or transmittal of priority documents.
3. An asterisk(*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b). In such a case, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.
4. The letters "NR" appearing in the right-hand column denote a priority document which was not received by the International Bureau or which the applicant did not request the receiving Office to prepare and transmit to the International Bureau, as provided by Rule 17.1(a) or (b), respectively. In such a case, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

| <u>Priority date</u> | <u>Priority application No.</u> | <u>Country or regional Office or PCT receiving Office</u> | <u>Date of receipt of priority document</u> |
|---------------------------|---------------------------------|---|---|
| ✓ 04 June 1999 (04.06.99) | 9913058.5 | GB | 13 July 2000 (13.07.00) |

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. (41-22) 740.14.35

Authorized officer

Carlos Naranjo

A handwritten signature in dark ink, appearing to read "Car".

Telephone No. (41-22) 338.83.38

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

HACKNEY NIGEL J
Mewburn Ellis
York House
23 Kingsway
London WC2B 6HP
GRANDE BRETAGNE

RECEIVED

- 6 SEP 2001

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

| | |
|-------------------------------------|------------|
| Date of mailing (day/month/year) | 03.09.2001 |
|-------------------------------------|------------|

| | |
|--|-------------------------------|
| Applicant's or agent's file reference NJH/MP5856604 | IMPORTANT NOTIFICATION |
|--|-------------------------------|

| | | |
|---|--|--|
| International application No. PCT/GB00/02127 | International filing date (day/month/year) 02/06/2000 | Priority date (day/month/year) 04/06/1999 |
|---|--|--|

| |
|---------------------------------------|
| Applicant TECHNOLOG LIMITED et al. |
|---------------------------------------|

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

| | |
|--|--|
| Name and mailing address of the IPEA/ European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | Authorized officer Kellerer, C Tel. +49 89 2399-2261 |
|--|--|



PATENT COOPERATION TREATY

PCT



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| | | | |
|--|--|--|---|
| Applicant's or agent's file reference NJH/MP5856604 | FOR FURTHER ACTION | | See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) |
| International application No. PCT/GB00/02127 | International filing date (<i>day/month/year</i>) 02/06/2000 | Priority date (<i>day/month/year</i>) 04/06/1999 | |
| International Patent Classification (IPC) or national classification and IPC G05D16/16 | | | |
| Applicant TECHNOLOG LIMITED et al. | | | |

| | |
|----|--|
| 1. | This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36. |
| 2. | This REPORT consists of a total of 6 sheets, including this cover sheet. |
| | <input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). |
| | These annexes consist of a total of 6 sheets. |

| | | | | | | | | | | | | | | | | | |
|------|---|---|---|----|-----------------------------------|-----|---|----|---|---|---|----|--|-----|--|------|--|
| 3. | This report contains indications relating to the following items: | | | | | | | | | | | | | | | | |
| | <table style="width: 100%;"> <tr> <td style="width: 5%;">I</td> <td><input checked="" type="checkbox"/> Basis of the report</td> </tr> <tr> <td>II</td> <td><input type="checkbox"/> Priority</td> </tr> <tr> <td>III</td> <td><input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td>IV</td> <td><input type="checkbox"/> Lack of unity of invention</td> </tr> <tr> <td>V</td> <td><input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td>VI</td> <td><input type="checkbox"/> Certain documents cited</td> </tr> <tr> <td>VII</td> <td><input checked="" type="checkbox"/> Certain defects in the international application</td> </tr> <tr> <td>VIII</td> <td><input type="checkbox"/> Certain observations on the international application</td> </tr> </table> | I | <input checked="" type="checkbox"/> Basis of the report | II | <input type="checkbox"/> Priority | III | <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability | IV | <input type="checkbox"/> Lack of unity of invention | V | <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | VI | <input type="checkbox"/> Certain documents cited | VII | <input checked="" type="checkbox"/> Certain defects in the international application | VIII | <input type="checkbox"/> Certain observations on the international application |
| I | <input checked="" type="checkbox"/> Basis of the report | | | | | | | | | | | | | | | | |
| II | <input type="checkbox"/> Priority | | | | | | | | | | | | | | | | |
| III | <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability | | | | | | | | | | | | | | | | |
| IV | <input type="checkbox"/> Lack of unity of invention | | | | | | | | | | | | | | | | |
| V | <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | | | | | | | | | | | | | | | | |
| VI | <input type="checkbox"/> Certain documents cited | | | | | | | | | | | | | | | | |
| VII | <input checked="" type="checkbox"/> Certain defects in the international application | | | | | | | | | | | | | | | | |
| VIII | <input type="checkbox"/> Certain observations on the international application | | | | | | | | | | | | | | | | |

| | |
|---|---|
| Date of submission of the demand 28/12/2000 | Date of completion of this report 03.09.2001 |
| Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | Authorized officer De Syllas, D Telephone No. +49 89 2399 2591 <div style="text-align: right;">  </div> |

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB00/02127

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):
Description, pages:

1-11 as originally filed

Claims, No.:

5 (part), 6-10 as originally filed

1-4, 5 (part) as received on 17/07/2001 with letter of 13/07/2001

Drawings, sheets:

1/5-5/5 as received on 14/08/2000 with letter of 31/07/2000

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB00/02127

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|------|-------------|
| Novelty (N) | Yes: | Claims |
| | No: | Claims 1-10 |
| Inventive step (IS) | Yes: | Claims |
| | No: | Claims 1-10 |
| Industrial applicability (IA) | Yes: | Claims 1-10 |
| | No: | Claims |

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/02127

1. CONCERNING SECTION V

1.1 Reference is made to the following documents:

- D1: US-A-4 966 188 (GARTNER JOSEF ET AL) 30 October 1990 (1990-10-30)
- D2: DE 37 41 364 A (HONEYWELL REGELSYSTEME GMBH) 15 June 1989 (1989-06-15)
- D3: GB-A-2 284 687 (DELTA FLUID PRODUCTS LTD) 14 June 1995 (1995-06-14)
- D4: WKS: 'Automatischer Durchflussregler' TECHNISCHE RUNDSCHAU., vol. 62, no. 44, 16 October 1970 (1970-10-16), page 29 XP002147281 HALLWAG VERLAG. BERN., CH ISSN: 1023-0823
- D5: FR-A-1 582 851 (FISHER GOVERNOR COMPANY) 10 October 1969 (1969-10-10)

1.2 Claim 1 defines a pilot valve comprising features known by the prior art disclosed by D1 to D5. More specifically:

- (i) D1 discloses a pneumatically operated gas-pressure controller. It comprises a pilot valve for controlling gas pressure through a control chamber. The pilot valve includes biasing means (15 in the sole figure of D1) to control a gate, a second chamber and a second diaphragm with the specifications defined by Claim 1. Reference is made to the sole figure, to the Abstract, to the passage at column 1, line 41 to column 2, line 10 and to column 37 to 67 describing the controller (3) and its operation.
- (ii) D2 discloses a pneumatic amplifier presenting the constructional features referring to the biasing means, the second chamber and the diaphragm settings defined by Claim 1. Reference is made to the two chambers (24, 26) and the two diaphragms (A1, A2) shown in figure 1 in connection with the common shaft (32) and the associated valves, as well as to the Abstract and the description at column 1, line 57 to column 2, line 33.
- (iii) D3 discloses a fluid pressure regulator, and more specifically such a regulator for use in a domestic gas meter installation. The pilot valve (60 in figure 1) of this

regulator is equipped with the features defined by Claim 1 for controllably driving the main valve (34). Reference is made to the Abstract.

- (iv) D4 discloses a fluid flow controlling valve (see figure 2 at page 29), the diaphragm setting of which also corresponds to the defined by Claim 1. Reference is made to the operation of this valve explained at page 29, left column, penultimate paragraph to right column of same page, first paragraph.
- (v) D5 discloses a gas regulating valve having the characteristics defined by Claim 1 of the present application. It includes a pilot valve (1 in figure 1) controllably driving a main valve, the construction and operation of which being explained in detail in conjunction with the ratio of the diaphragms areas at page 3, line 18 to page 4, line 18.

1.3 D1 to D5 refer to gas control or pneumatic systems rather than specifically referring to water flow control in a water supply system. However, since at least D3 to D4 are clearly directed to fluid supply systems in general, it is considered that their disclosures is directed to both gas and liquid supply systems. Alone the mention of the intended use in Claim 1 (specifying water as the liquid) does not involve the use of some extra features, when compared with the device known from the prior art documents (see e.g. D4), which renders the claimed device specially suitable to operate with water, and which does not derive obviously from this prior art. Specific reference on this point is made to D4 (left column, third line; right column, fourth line) which explicitly discusses the use of the flow control valve disclosed thereby in a liquids supply system.

1.4 The subject-matter of Claim 1, which is directed to a water supply system, is therefore anticipated in its full extent at least by either D3 or D4. Claim 1 does not meet thus the requirements of novelty (Article 33(2) PCT).

1.5 Dependent Claims 2 to 10 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, involve an inventive step. These features are comprised in the disclosures of the above cited documents (D1 and D2 disclose the features of all dependent claims, D3 and D4 the features of Claims 2 to 7, i.e. without the second diaphragm and D5 the

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/02127

features of Claims 6 to 10). Thus the requirements set by Article 33(2) are not fulfilled by any of the dependent claims.

- 1.6 Since the application and its claims are all directed to pilot valves, the claimed subject-matter is industrially applicable (Article 33(4) PCT).

2. CONCERNING SECTION VII

- 2.1 The independent claim is not in two-part form, the first part defining the features known in the closest prior art (Rule 6.3.b(i),(ii) PCT).
- 2.2 There are no reference signs in parentheses in the claims (Rule 6.2(b) PCT).
- 2.3 In order to set out more fully the background art useful for understanding the invention, the closest prior art (see D3 to D4) should have been acknowledged in the introductory part of the description (Rule 5.1.(a)(ii) PCT).

pct2324

Claims

1. A pilot valve for use in a water supply system including

biassing means to control a gate for controlling water flow through a control chamber;

a second chamber sealed by a second chamber diaphragm into which control pressure is applicable for also controlling the operation of the gate, whereby, in use, an increase in control pressure acts to reduce water flow through the gate;

wherein the side of the diaphragm against which the control pressure is not applied, is in fluid communication with the control chamber.

2. A pilot valve according to claim 1 wherein the biassing means is biased to open the gate.

3. A pilot valve according to claim 2 wherein the biassing means is rigidly connected to the gate by a mechanical linkage.

4. A pilot valve according to claim 3 wherein the diaphragm is rigidly connected to the gate by a mechanical linkage.

5. A pilot valve according to claim 3 or claim 4

1/5

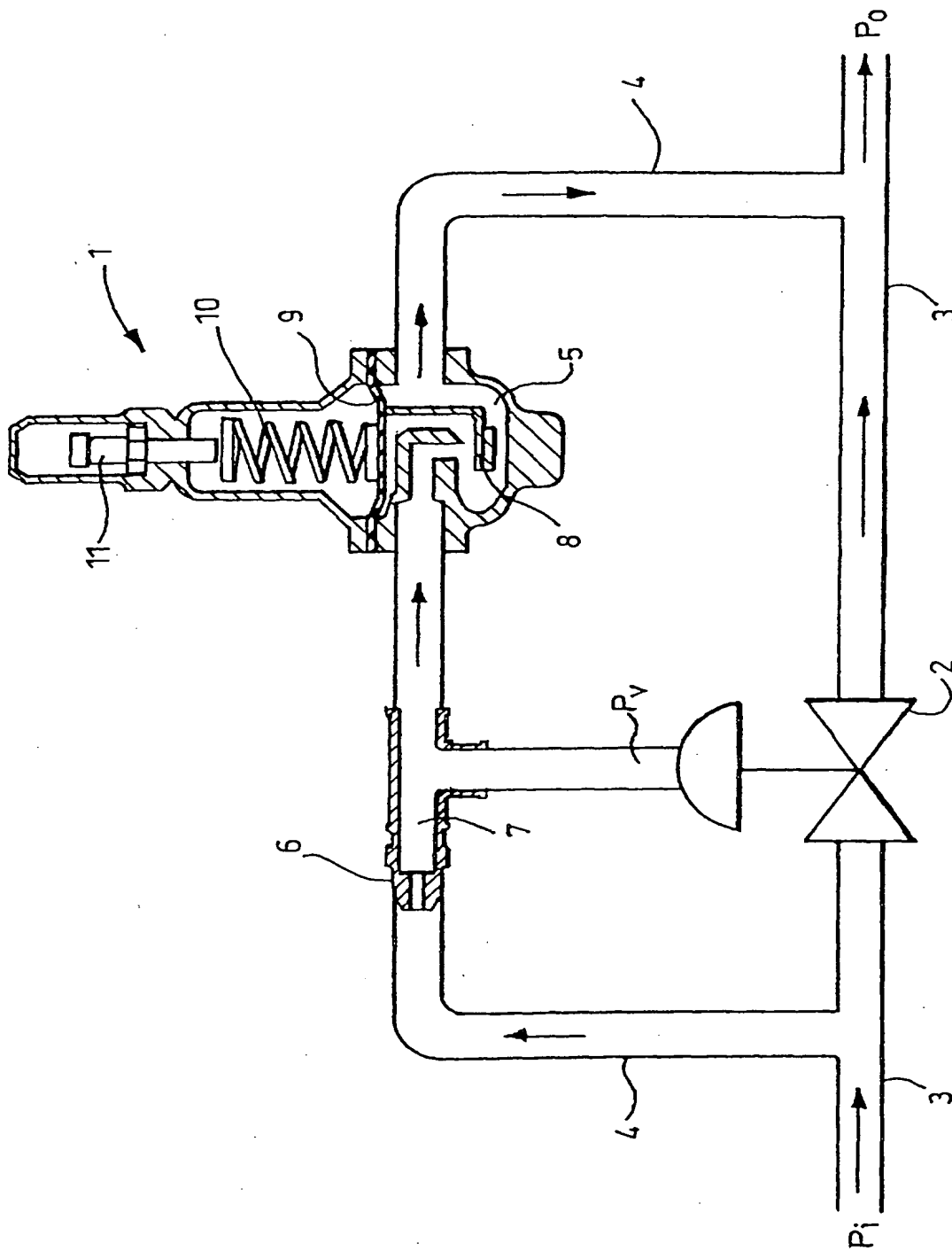


FIG.1.

2 / 5

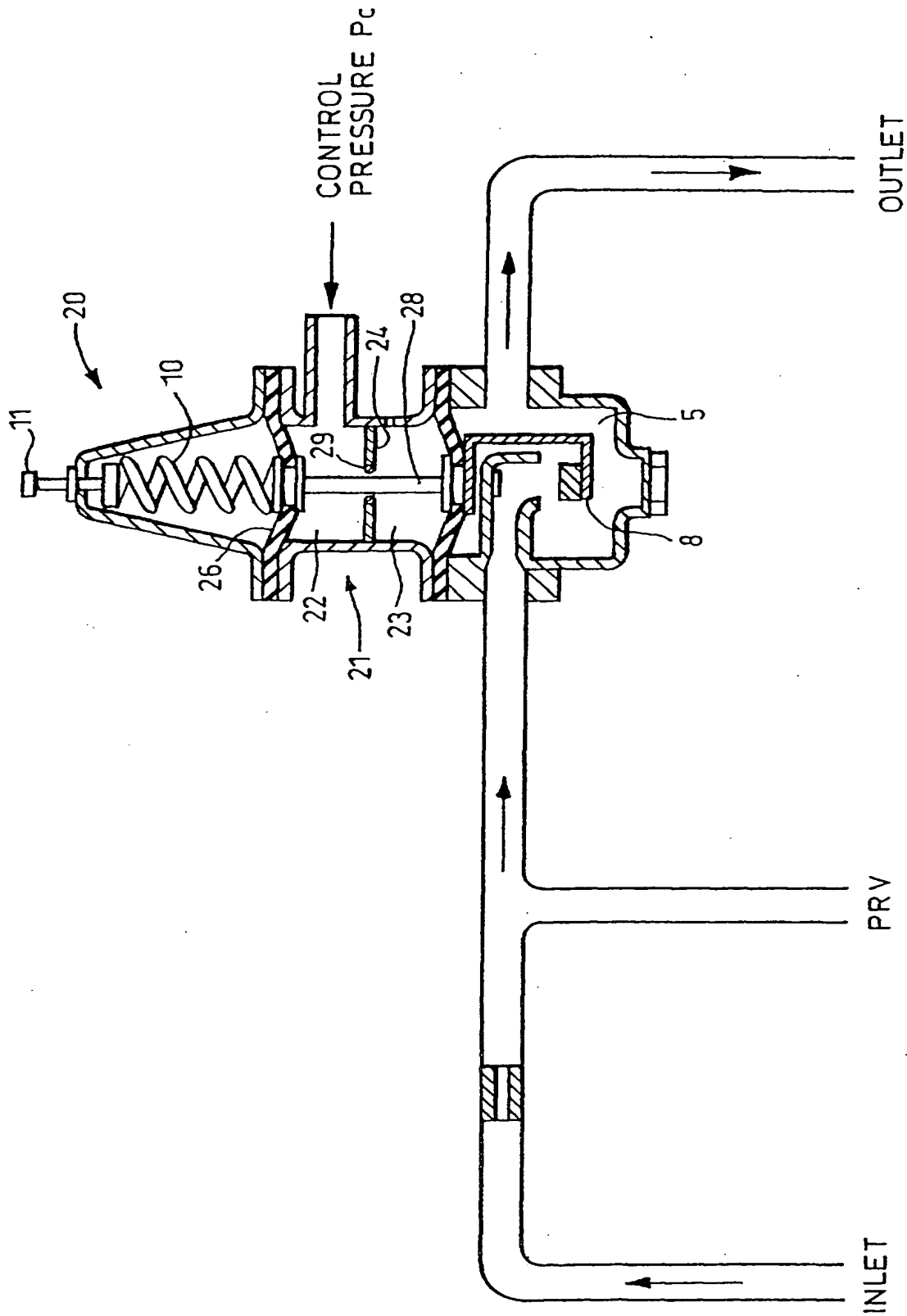


FIG.2.

3/5

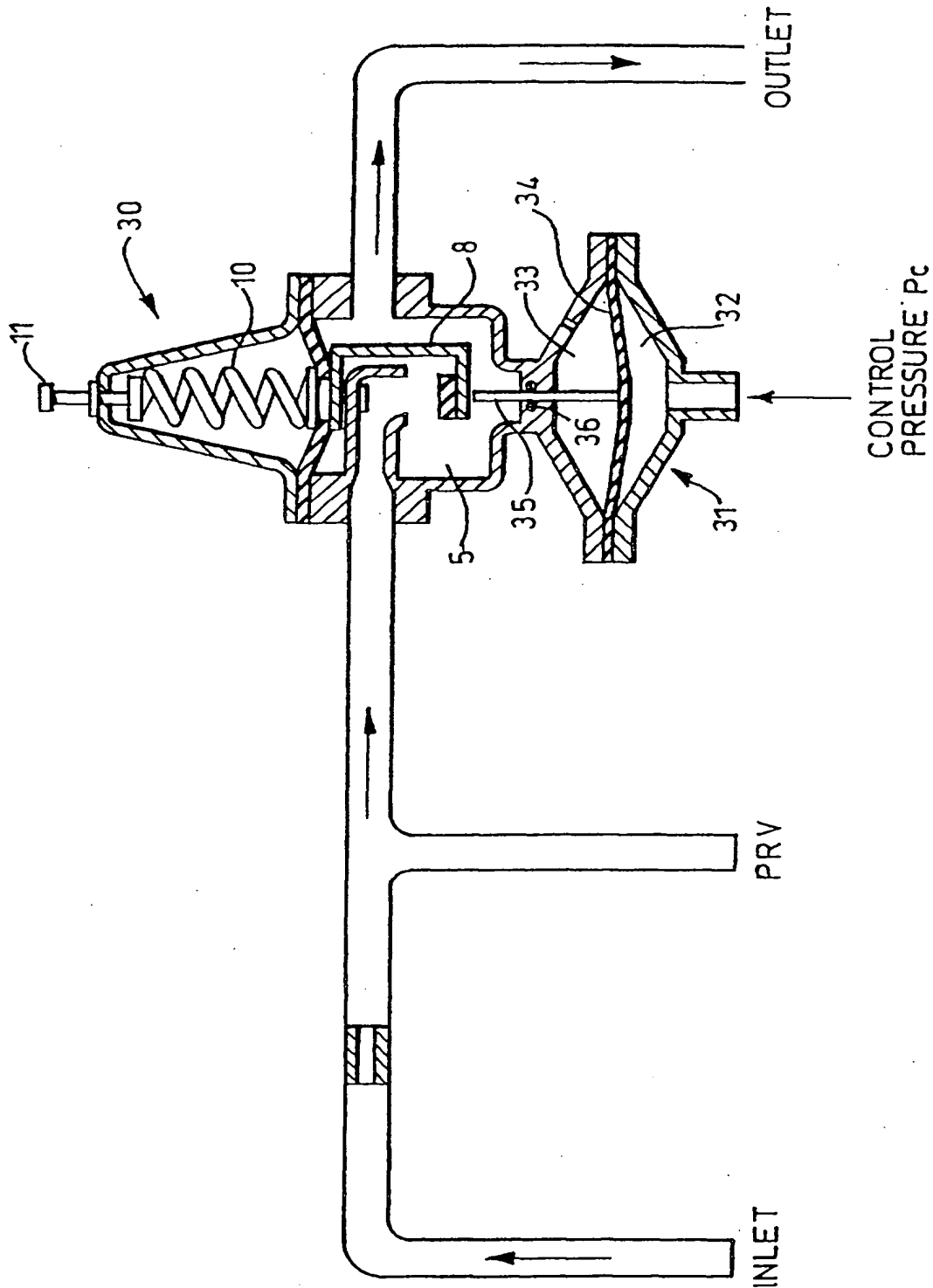


FIG.3.

4/5

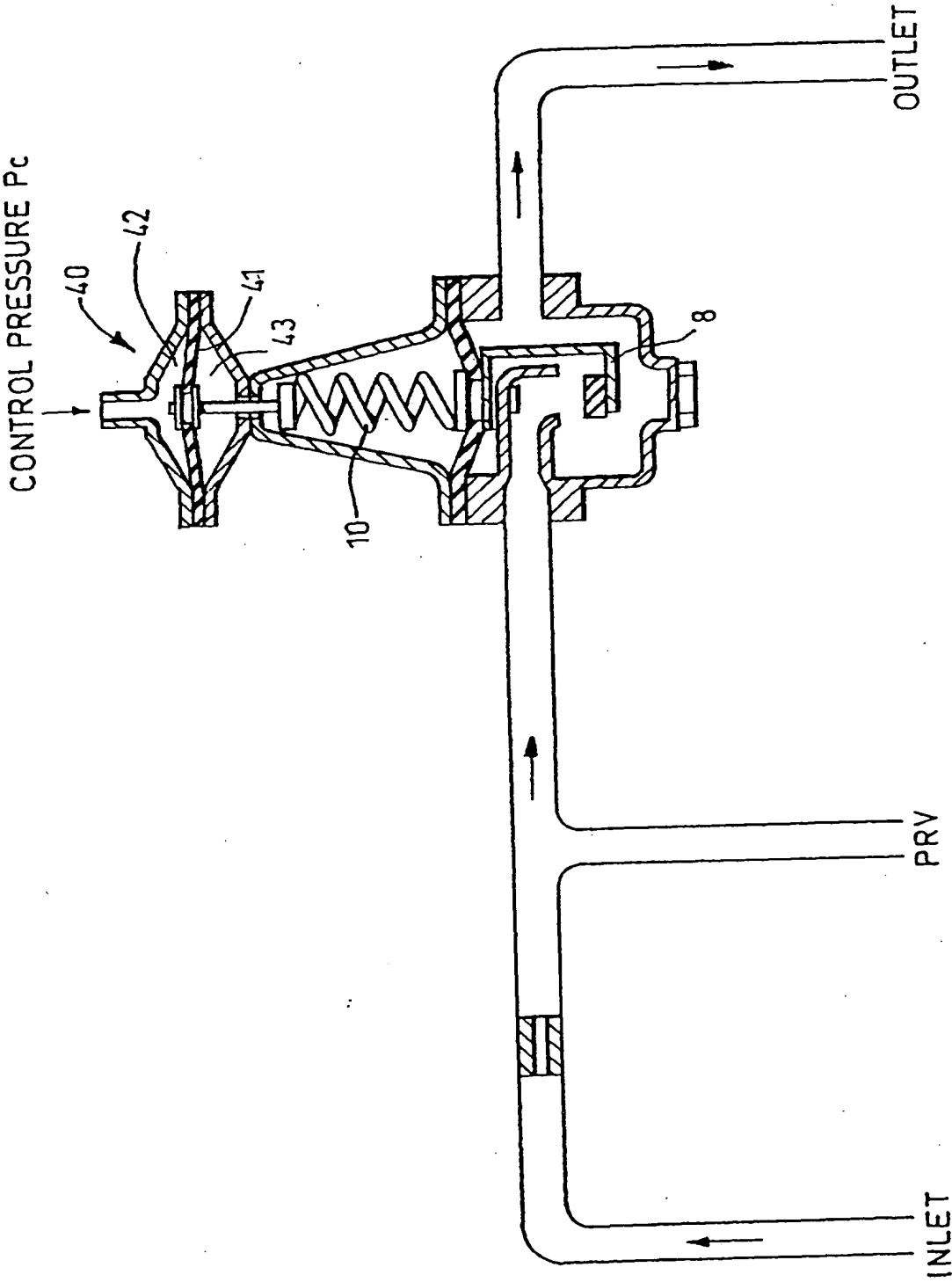


FIG.4.

5/5

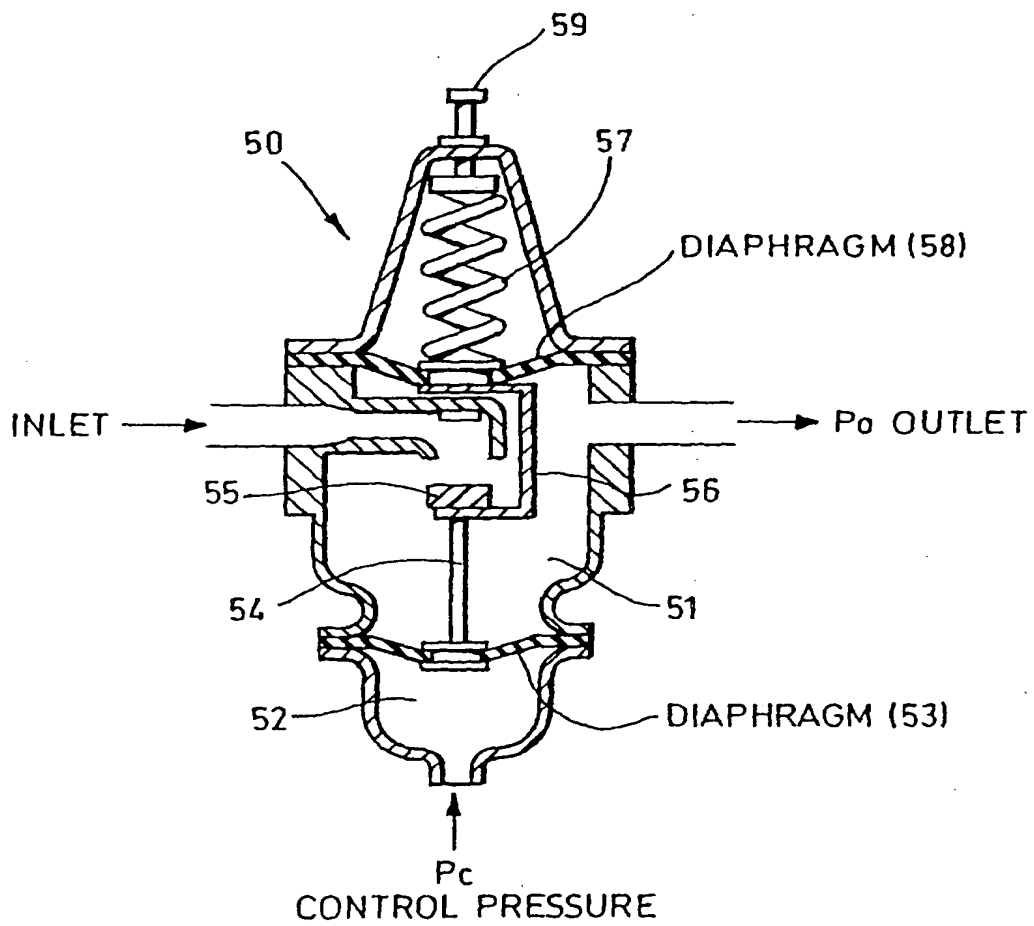


FIG.5.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| | | |
|---|---|--|
| Applicant's or agent's file reference NJH/MP5858604 | FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below. | |
| International application No. PCT/GB 00/ 02127 | International filing date (day/month/year) 02/06/2000 | (Earliest) Priority Date (day/month/year) 04/06/1999 |
| Applicant TECHNOLOG LIMITED | | |

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :
- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

- ☒ as suggested by the applicant.
- ☐ because the applicant failed to suggest a figure.
- ☐ because this figure better characterizes the invention.

5

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/02127

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G05D16/16 G05D16/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G05D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | US 4 966 188 A (GARTNER JOSEF ET AL) 30 October 1990 (1990-10-30) the whole document | 1-10 |
| X | DE 37 41 364 A (HONEYWELL REGELSYSTEME GMBH) 15 June 1989 (1989-06-15) the whole document | 1-10 |
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13 September 2000

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